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Macroeconomic Consequences of Accounting: The Effect of Accounting Conservatism on Macroeconomic Indicators and the Money Supply

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by

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Dedication

To Mom and Dad

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Macroeconomic Consequences of Accounting: The Effect of Accounting Conservatism on Macroeconomic Indicators and the Money Supply

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This study investigates the macroeconomic consequences of firm-level accounting conservatism. Consistent with conditional conservatism extending to the aggregate level, I demonstrate that annual estimates of aggregate corporate profits and gross domestic product from 1929 to 2007 compiled by the U.S. Bureau of Economic Analysis are more sensitive to negative aggregate cash flow news than to positive aggregate cash flow news. Next, I estimate the dollar value impact of firm-level accounting conservatism on measurements of macroeconomic fundamentals. Finally, I show that the federal funds rate set by the U.S. Federal Reserve tends to be lower when the dollar value impact of firm-level accounting conservatism on gross domestic product measurements is larger. These results suggest that accounting can impact social welfare by altering the measurement attributes of key macroeconomic indicators and shaping monetary policy decisions which regulate the money supply and alter macroeconomic growth.

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Chapter 1: Introduction

This study investigates the macroeconomic consequences of firm-level accounting conservatism. Accounting conservatism has been defined as the tendency to require a higher degree of verification for recognizing gains as compared to losses (Basu 1997, Watts 2003a). Using firm-level stock returns as a proxy for news, Basu (1997) provides evidence that this asymmetric verification requirement results in conditionally conservative firm-level earnings that are more sensitive to bad news than to good news. A large subsequent literature asserts that firms choose to report conservatively in order to lower debt and compensation contracting costs, reduce litigation risk, and minimize tax payments. Firm-level earnings could also be conservative in response to accounting standards, securities regulation, and pressure from external auditors (see Watts 2003a and 2003b for a review).

I examine whether firm-level conservatism aggregates to alter the measurement attributes of macroeconomic indicators and influence monetary policy decisions. First, I investigate whether the summation of individual firm earnings results in a conditionally conservative aggregate corporate profits signal. Specifically, I examine the time-series behavior of annual estimates of aggregate corporate profits from 1929 to 2007 as compiled by the U.S. Bureau of Economic Analysis (BEA), an agency of the U.S. Department of Commerce. I adapt the Basu (1997) asymmetric timeliness regression to accommodate aggregate-level time-series data, and I form proxies for aggregate corporate sector news using the Campbell (1991) return decomposition framework. Consistent with the existence of conditional conservatism at the aggregate level, the results indicate that aggregate corporate profits are more sensitive to negative aggregate cash flow news than to positive aggregate cash flow news.

Identifying conditional conservatism within aggregate corporate profits is important for several reasons. First, U.S. Census Bureau data indicates that publicly traded firms constitute only 1% of all firms and account for less than 33% of business employment (Davis et al. 2006). Because the aggregate corporate profits measure compiled by the Bureau of Economic Analysis includes the earnings of both public and private firms, my study helps identify how firm-level accounting conservatism influences measurements of the economic performance of the entire U.S. corporate sector.

Second, the BEA's measure of aggregate corporate profits is a key macroeconomic indicator that receives extensive media attention and is used by a wide variety of market participants. For example, aggregate corporate profits is used by macroeconomic forecasters to predict aggregate investment in plant and equipment, government policy makers to project tax receipts, firms to make long-term investment and employment planning decisions, investors to assess the overall financial health of the U.S. corporate sector, and academic researchers to identify complex macroeconomic relationships (BEA 2004).

Third, and perhaps most importantly, aggregate corporate profits are a significant component of U.S. gross domestic product (GDP). In 2007, aggregate corporate profits totaled $1.6 trillion, which amounted to 11.9% of U.S. GDP for the year. GDP is a closely watched macroeconomic indicator that provides a summary measure of economic conditions in the United States (BEA 2008). Moreover, GDP measurements influence decisions made by policy makers, firms, investors, and households (BEA 2002). For example, GDP estimates are used by the federal government in forming the national budget and assessing the effects of fiscal policy decisions, and the U.S. Federal Reserve relies on GDP estimates when executing monetary policy. Accordingly, I examine whether the influence of firm-level accounting conservatism extends beyond aggregate

corporate profits to alter the measurement attributes of GDP signals. The results indicate that GDP measurements are more sensitive to negative aggregate cash flow news than to positive aggregate cash flow news.

Finally, I investigate whether accounting conservatism's impact on macroeconomic indicators affects macroeconomic decision making. Specifically, I examine monetary policy decisions made by the U.S. Federal Reserve (the Fed). One way the Fed executes monetary policy is by manipulating the federal funds rate in order to influence the money supply and alter macroeconomic growth. The Federal Open Market Committee (FOMC) of the Fed relies on GDP measurements when setting the federal funds rate (Taylor 1993). Therefore, firm-level accounting conservatism may influence federal funds rate decisions by altering the GDP measurements upon which the FOMC relies.

I investigate accounting conservatism's influence on FOMC decisions by first quantifying the dollar value impact of firm-level accounting conservatism on measurements of macroeconomic fundamentals. From 1963 to 2007, I estimate that aggregate corporate profits and gross domestic product would have averaged approximately $114 billion greater per year in the absence of accounting conservatism. Finally, I estimate a series of monetary policy reaction functions. The results indicate that the federal funds rate tends to be lower when the dollar value impact of firm-level conservatism on GDP measurements is larger.

The results of this study should be of interest to both accounting and economics researchers as well as to a variety of capital market participants. Prior research suggests that accounting serves several non-mutually exclusive roles including providing new information to equity investors (see Kothari 2001 for a review), facilitating efficient contracting (Watts and Zimmerman 1986, Ball 2001), disciplining managers' disclosure

behavior (Gigler and Hemmer 1998, Stocken 2000, Lundholm 2003), and improving managerial decision making (Waymire 2009). These prior results are important because they imply that accounting can help solve society's fundamental economic problem of maximizing social welfare by allocating scarce resources to their most efficient uses.

My study contributes to the literature by empirically identifying previously unexplored macroeconomic consequences of accounting. My results suggest that firm-level accounting conservatism influences the price of money (i.e. interest rates) by altering the measurement attributes of key macroeconomic indicators used by the Fed when executing monetary policy. Thus, aggregated accounting measurements may alter firms' cost of capital through the risk-free rate, even in a Capital Asset Pricing Model environment without firm-specific information risk. As a result, accounting's impact on social welfare may not be strictly limited to helping allocate resources towards (away) from firms and projects with the highest (lowest) net present value. Instead, my results suggest that accounting can also affect the money supply (i.e. the total number of dollars in the macroeconomic pie). In turn, changes in firms' cost of capital should influence not only resource allocation decisions but also firms' investment opportunity sets, the pace of macroeconomic growth, aggregate output and inflation, and total social welfare.

Second, my results could have implications for policy setters and macroeconomic decision makers. The Financial Accounting Standards Board (FASB) recently released Statement of Financial Accounting Concepts (SFAC) No. 8 as part of convergence efforts with the International Accounting Standards Board. SFAC No. 8 revises the FASB's conceptual framework and states that the aim of financial reporting is to provide information that is useful to investors and creditors in making decisions about providing resources to a firm. As part of the focus on individual reporting entities rather than on the economy as a whole, the FASB excludes regulators, fiscal policy setters, and other

macroeconomic decision makers from the list of primary financial statement users (FASB 2010). However, my results suggest that financial reporting choices made by self-interested firms acting within the bounds of accounting standards can aggregate and influence output from the national economic accounts. Consequently, standard setter actions designed to aid microeconomic decision makers (e.g. investors and creditors) may produce inadvertent macroeconomic consequences by imposing an information externality on decision makers who rely on aggregate measurements (e.g. a central banker setting interest rates).

Furthermore, understanding how accounting measurements interact with the national economic accounts is important because measurement practices at the firm level can affect the way economists measure economic output and income at the aggregate level. For example, the increased use of fair value measurements and the proposed convergence between Generally Accepted Accounting Principles (GAAP) and International Financial Reporting Standards (IFRS) could indirectly change the measurement attributes of aggregate corporate profits and GDP and result in unintended macroeconomic consequences.

Lastly, my study has implications for academic researchers. The majority of capital markets research in accounting focuses on microeconomic behavior and generally presumes that capital allocation decisions have been delegated to a market. However, the U.S. is a mixed economy with numerous elements of central planning including an active central bank, partial nationalization of major banks and heavy industry, and fiscal intervention in times of financial crises. As an example, the Federal Reserve acts as a pseudo-monopolist by influencing short-term interest rates outside of a pure market setting. My results suggest that conservative financial reporting at the firm level influences monetary policy decisions by altering the measurement attributes of statistical

aggregates that the Federal Reserve and other macroeconomic decision makers rely upon. These results are important because they suggest that accounting can affect both the productive and exchange sectors of the economy by influencing the money supply and that accounting's impact on social welfare is not limited to market settings. Additionally, understanding how central bankers, regulators, and other macroeconomic actors use accounting information when making centralized economic decisions is particularly important given a shift towards more government regulation and intervention in global capital markets.

Chapter 2: Motivation and Prior Literature

2.1 Motivation

Whether or not firm-level conditional conservatism extends to the aggregate level is an open empirical question. The summation of individual firm earnings could result in a conservative aggregate corporate profits signal if the determinants of conservative financial reporting are positively correlated across firms. For instance, prior research suggests that the demand for conservatism varies according to the regulatory and litigation environments which are systematic across firms within a given country (Ball et al. 2000). Seetharaman et al. (2005) demonstrate that conservatism declined for U.S. firms after passage of the Private Securities Litigation Reform Act of 1995. The authors conclude that a decrease in litigation risk reduced firms' need for conservative reporting. Similarly, Lobo and Zhou (2006) find that conservatism increased after passage of the Sarbanes-Oxley Act of 2002, consistent with an increase in litigation risk for both managers and auditors. Finally, Callen, Guan, and Qiu (2010) find that firm-level earnings became more conservative after the passage of state anti-takeover laws, consistent with conservatism acting as a substitute governance mechanism. These results suggest that exogenous shocks to the regulatory and litigation environments can affect the degree of earnings conservatism for a large number of firms simultaneously. Hence, a portion of the conservatism present in firms' earnings may be systematic and not diversified away when aggregating the population of firm-level earnings.

However, aggregate corporate profits may fail to exhibit an asymmetric response to bad news as compared to good news for several reasons. First, aggregate corporate profits as compiled by the Bureau of Economic Analysis include the earnings of both publicly traded and privately held firms. The inclusion of private firms is notable

because private firms constitute approximately 99% of all firms in the U.S. (Davis et al. 2006). Additionally, private firms generally have less incentive to report conservatively (Ball and Shivakumar 2005). For example, compared to public firms, private firms should be better able to resolve information asymmetry between management and other parties through private communications with shareholders, creditors, employees, and suppliers. As a result, there is less demand for accounting conservatism as a governance device within private firms. Consistent with this lesser demand for conservatism, Ball and Shivakumar (2005) empirically document that the earnings of private firms in the U.K. exhibit significantly less timely loss recognition than public firms facing similar regulation, audit practices, and taxes. Therefore, aggregate corporate profits as compiled by the Bureau of Economic Analysis may fail to exhibit conditional conservatism given the relative mix and reporting incentives of the public and private firms in the population.

Second, Givoly, Hayn, and Natarajan (2007) show that the use of aggregated data biases against finding an asymmetric response of earnings to bad news as compared to good news. The authors note that individual economic events (i.e. news) and their impact on a firm's earnings are not directly observable. Instead, researchers only have access to cumulative measures of news and earnings over a period of time (e.g. a year). The authors employ simulation techniques and demonstrate that the use of data which aggregates a heterogeneous population can mask the presence of conservatism even when the underlying data generating process includes an asymmetric response to bad news as compared to good news.

Additionally, I use measures of news and earnings that have been aggregated across firms, i.e. not just across time for individual firms as in Givoly et al. (2007). This additional level of aggregation could further obscure conservatism at the aggregate level even if individual firms are reporting conservatively. For example, earnings-return

relation based measures of conservatism often use firm-specific returns as a proxy for news (e.g. Basu 1997, Khan and Watts 2009). However, Vuolteenaho (2002) demonstrates that firm-level returns are driven by idiosyncratic cash flow news which is largely diversified away in aggregate portfolios. Additionally, bad news for some firms could be good news for other firms due to competition within an industry or due to differing firm sensitivities to macroeconomic conditions (Shivakumar 2007).

Finally, accounting conservatism within the BEA's measure of aggregate corporate profits could be reduced or eliminated as a result of the BEA's source data and construction methods. The BEA uses proprietary income tax return data in addition to publicly available external financial reporting data when constructing its measure of aggregate corporate profits. Firms have less flexibility to make income-decreasing accruals for tax reporting as compared to financial reporting (Ball and Shivakumar 2005). This reduced flexibility may limit the degree of conditional conservatism within the BEA measure of aggregate corporate profits. Furthermore, the BEA's aggregation methodology involves replacing certain historical cost measures with current cost estimates. These adjustments could reduce the degree of conservatism within aggregate corporate profits. For example, conditionally conservative lower of cost or market inventory writedowns are removed from BEA estimates of aggregate corporate profits.[1] The BEA could also adjust estimates of aggregate corporate profits for any bias introduced by accounting conservatism.

My results help answer the empirical question of whether conditional conservatism extends to the aggregate level by showing that BEA estimates of aggregate corporate profits and gross domestic product are more sensitive to negative aggregate cash flow news than to positive aggregate cash flow news. Additionally, my results

[1] See Chapter 5 for a detailed description of the BEA's source data and aggregation methodology.

suggest that accounting conservatism's effect on the measurement attributes of macroeconomic fundamentals has the potential to influence monetary policy decisions made by the Federal Reserve.

2.2 Prior Literature – Aggregate Earnings

My study is related to multiple streams of literature. My study is most closely related to the growing literature which examines the properties of aggregate earnings. One prominent set of studies within this literature attempts to determine whether documented earnings-return anomalies identified within firm-level earnings also persist at the aggregate level. For example, Kothari, Lewellen, and Warner (2006) examine whether post-earnings announcement drift exists at the aggregate level. The authors aggregate quarterly returns and earnings for Compustat firms and estimate aggregate earnings surprises. Regressing aggregate returns on the aggregate earnings surprises for the past four quarters yields two primary results. First, the correlations between current aggregate returns and aggregate earnings surprises for prior quarters are close to zero. This result is inconsistent with post-earnings announcement drift at the aggregate level. Second, the authors find a negative contemporaneous relation between aggregate earnings surprises and aggregate returns.

Cready and Gurun (2010) confirm this negative contemporaneous relation between aggregate earnings surprises and aggregate returns using short-window tests. This negative contemporaneous relation stands in stark contrast to firm-level results and is surprising given the theoretical relationships underlying traditional valuation models. As an illustration, a firm's stock price should be equal to the discounted value of the firm's future cash flows. If earnings serve as informative signals about the firm's future cash flows, then positive earnings surprises should cause investors to raise their expectations of the firm's future cash flows. Thus, all else equal, the firm's stock price

should rise. However, the results of Kothari et al. (2006) and Cready and Gurun (2010) suggest that unexpectedly high earnings at the aggregate level are associated with negative aggregate market returns.

Recent research has tried to resolve this disconnect between the firm-level and aggregate-level results. Shivakumar (2007) finds evidence that positive aggregate earnings surprises lead future inflation. Therefore, positive aggregate earnings surprises could cause investors to increase their expectation about future discount rates. If this increase in investors' expectations about future discount rates swamps the increase in investors' expectations about future cash flows, then aggregate returns will be negative. Similarly, Sadka and Sadka (2009) find that investors can better predict earnings changes at the aggregate level than at the firm level. The authors also find that prices better anticipate earnings growth at the aggregate level. Therefore, aggregate earnings changes might provide little or no information about future cash flows because that information has already been impounded by investors. In turn, the contemporaneous earnings-return relation moves from a positive correlation at the firm level to a negative correlation at the aggregate level because adding firms to the portfolio increases the predictability of earnings and reduces the relative importance of cash flow news.

Finally, Hirshleifer, Hou, and Teoh (2009) examine whether the accrual anomaly extends to the aggregate level. Similar to previously documented firm-level results, the authors find that aggregate accruals are less persistent than aggregate cash flows. However, in contrast to results at the firm level (e.g. Sloan 1996), the authors find that aggregate accruals are positively associated with future aggregate market returns. This result suggests that the accrual anomaly actually reverses at the aggregate level, which is inconsistent with the earnings fixation hypothesis. Moreover, the authors find that the contemporaneous correlation between innovations in aggregate accruals and aggregate

returns is negative. This result is consistent with the negative contemporaneous relation between aggregate earnings changes and aggregate returns identified by Kothari et al. (2006) and Cready and Gurun (2010) being driven largely by the accrual component of earnings.

A related set of studies documents the properties of aggregate earnings and further examines the relation between aggregate earnings and aggregate returns. For example, Anilowski, Feng, and Skinner (2007) investigate whether earnings guidance issued by individual firms collectively affects aggregate stock returns through investors' estimates of aggregate expected future cash flows, expected returns, or both. The authors find that changes in the aggregate proportion of downward guidance are associated with other measures of aggregate earnings news constructed from analysts forecasts and time-series models. Thus, aggregate earnings guidance possibly provides timely information about the overall corporate sector health and the economy as a whole. However, the authors find no evidence of a relation between aggregate guidance and aggregate returns using quarterly measures. Moreover, while the authors do find a weak association between aggregate guidance and aggregate returns using monthly data, the direction of causality is unclear. For example, it is possible that macroeconomic news simultaneously drives guidance behavior and aggregate returns rather than aggregate earnings guidance leading aggregate returns (Shivakumar 2007).

Ball, Sadka, and Sadka (2009) use a principal-components analysis to show that common earnings factors explain a significant portion of firm-level variation in earnings. Said differently, Ball et al. (2009) find common factors in earnings in much the same way that Fama and French (1993) identified common factors in returns (e.g. market, size, and book-to-market). Further, the authors find that cross-sectional variation in firms' returns appears to be correlated with firms' sensitivities to the earnings factors. These results

suggests that earnings shocks across companies have a substantial systematic component and that earnings performance is an underlying source of risk that is priced by the market.

Finally, Jorgensen et al. (2009) examine the properties of aggregate earnings in an effort to identify the aggregate valuation effects of changes in accounting standards. The authors perform empirical tests by summing the earnings and operating incomes of all firms on Compustat. The authors find that previously documented firm-level earnings attributes disappear in the aggregate. For example, the authors find no evidence that aggregate earnings can predict aggregate cash flows. The authors also find that the relation between aggregate earnings and aggregate returns has remained stable over time despite numerous changes in accounting standards. The authors conclude that the informativeness of earnings to a diversified investor is largely unaffected by changes in accounting standards and enforcement (i.e. accounting standards are diversifiable).

I contribute to this literature in multiple ways. In contrast to the studies above which aggregate Compustat data, I examine the time-series behavior of aggregate corporate profits compiled by the Bureau of Economic Analysis. This use of BEA data has multiple advantages. First, BEA data aggregates earnings for all firms, both public and private, whereas Compustat data only includes the 1% of all firms that are publicly traded. Second, BEA data is available beginning in 1929 while Compustat data is only available beginning in 1962, and this longer time series increases the power of the empirical tests. Third, my study identifies links between firm-level earnings and macroeconomic variables, which is necessary in order to understand the important and complicated relationships between aggregate earnings, aggregate stock market returns, and the macroeconomy (Shivakumar 2007). In this case, my study demonstrates that firm-level financial reporting choices can aggregate and influence outputs from the national economic accounts including aggregate corporate profits and GDP.

2.3 Prior Literature – Accounting Conservatism

My study is also related to the literature which examines the determinants and consequences of firm-level accounting conservatism. Accounting conservatism is typically defined in the empirical accounting literature as the differential verifiability required for recognizing gains as compared to losses (Basu 1997, Watts 2003a). Evidence of accounting conservatism can be traced as far back as trading partnership records from medieval Europe (see Basu 1997 and the citations therein). However, debate persists as to accounting conservatism's value within a system of external financial reporting (Ball and Shivakumar 2005). In Statement of Financial Accounting Concepts No. 8, the Financial Accounting Standards Board does not endorse conservatism because conservatism can introduce a downward bias in income and net assets that conflicts with certain qualitative characteristics of useful financial information including representative faithfulness and neutrality. However, advocates of accounting conservatism counter that conservatism's long history and survival in the face of criticism from standard setters suggests that conservatism has benefits. Advocates of conservatism argue that if conservatism arises endogenously as part of a firm's solution to its profit maximization problem, then eliminating conservatism could constrain the firm and lower shareholder welfare (Watts 2003a).

Basu (1997) provides empirical evidence that firm-level earnings are conditionally conservative. Using firm-level stock returns as a proxy for news, Basu (1997) shows that firm-level earnings are more sensitive to bad news than to good news. Additionally, Basu (1997) shows that negative earnings changes are more likely to reverse in the following period than positive earnings changes. This result suggests that anticipated future bad news is recognized immediately as a transitory negative earnings

shock while anticipated future good news is recognized over several future periods as the anticipated gains are realized.

A large subsequent literature attempts to identify the determinants of accounting conservatism. The most common explanation for the existence of conservatism is that conservatism facilitates efficient contracting. In other words, conservatism potentially reduces moral hazard problems resulting from interactions between various parties with asymmetric information, asymmetric payoffs, limited horizons, and limited liability (Watts 2003a). For example, managers with limited employment horizons and private information regarding the firm's prospects often have the incentive to overstate accounting earnings in order to maintain their employment status and meet bonus targets. Accounting conservatism may offset the upward bias in earnings and limit the ability of managers to hide losses and enrich themselves through opportunistic behavior. In turn, cash remains inside the firm and available for investment rather than being paid to management. Additionally, shareholders and boards of directors may be able to identify and remove underperforming managers earlier. Thus, accounting conservatism can act as a governance mechanism (i.e. as a substitute for monitoring) which increases the value of the firm and the welfare of shareholders (Watts 2003a).

Accounting conservatism may also facilitate efficient debt contracting. For example, consider a lender who is considering making a loan to a firm. The lender likely has an asymmetric payoff. That is, the lender faces losses if the firm's future cash flows are insufficient to cover the interest and principal payments on the loan. However, the lender does not enjoy any additional compensation if the firm's net assets are above the face value of the debt. The timely loss recognition associated with conservatism could provide the lender with earlier signals that the firm's prospects are deteriorating. In turn, earlier violation of debt covenants should allow debt holders to seize control of the firm

away from the manager at an earlier point in time, thus avoiding any further destruction of firm value (Watts 2003a). Moreover, lenders may provide the firm better terms of trade (i.e. a lower interest rate) in exchange for a commitment to a conservative reporting regime.[2]

Additional proposed explanations for accounting conservatism include taxation and litigation. Income taxation potentially leads to conservative reporting because profitable firms wish to defer income in an effort to reduce the present value of tax payments and increase the value of the firm (Watts 2003a). The litigation explanation for accounting conservatism is based on an asymmetric payoff argument. If overstating the firm's net assets is more likely to result in lawsuits than understating the firm's net assets, then managers have an incentive to use conservative reporting to reduce the risk of costly litigation. Similarly, auditors face an asymmetric litigation risk. That is, auditors are less likely to face investor lawsuits for forgone gains due to understated net assets and income than they are to face lawsuits for losses due to overstated net assets and income. Therefore, auditors have an incentive to pressure their clients into a conservative reporting regime (Watts 2003a).

Finally, accounting regulation has been proposed as an explanation for the existence of accounting conservatism. Similar to auditors, regulators and standard setters likely face asymmetric payoffs. For example, the Securities and Exchange Commission and the Financial Accounting Standards Board typically face a great deal of criticism after high profile accounting scandals (e.g. Enron). However, regulator actions which prevented other such failures may not be as visible to the public. Therefore, regulators may demand conservatism in order to reduce expected political costs, and standard setters have an incentive to promulgate guidance which results in conservative financial

[2] For a challenge to the debt compensation explanation for accounting conservatism, see Gigler, Kanodia, Sapra, and Venugopalan (2009).

reporting. For example, while the FASB publicly promotes neutral accounting standards, several accounting practices remain conservative (e.g. lower of cost or market inventory rules, LIFO inventory valuation, and recognition of contingent liabilities) (Watts 2003a).

I contribute to this literature in several ways. First, I demonstrate that the summation of individual firm earnings results in a conditionally conservative aggregate corporate profits signal. This result is consistent with the determinants of conservatism being positively correlated across firms. Additionally, because the BEA measure of aggregate corporate profits includes all firms and is constructed using both external financial reporting and tax data, my results could provide insights on the incentives for conservative financial reporting by private firms and by all firms for tax reporting purposes. Finally, my results may help reconcile seemingly opposing views on the net benefits of accounting conservatism. That is, accounting conservatism could be part of the optimal financial reporting strategy for individual firms. However, standard setting actions which limit conservatism are not necessarily welfare decreasing if accounting conservatism alters the measurement attributes of key macroeconomic indicators and imposes an information externality on macroeconomic decision makers.

2.4 Prior Literature – The Economic Role of Accounting

Finally, my study is related to the literature which examines the economic role of external financial reporting. In a broad sense, the various topical areas of accounting research can all provide insights on how accounting helps solve society's fundamental economic problem of allocating scarce resources to their most efficient uses in an effort to maximize social welfare. For example, a portion of financial accounting research attempts to identify cases where investors fail to fully understand the implications of accounting information. Such results are interesting and important because they suggest that more efficient resource allocations, and potentially even Pareto welfare

improvements, are possible with changes in the information content of earnings or with changes in investor decision making. Similarly, managerial accounting research seeks to understand how managers use accounting information to improve decision making and resource utilization. Likewise, auditing research explores topics including whether independent verification of external financial reporting data improves the efficiency of capital markets. Lastly, tax and public finance research investigates the economic consequences of wealth redistributions when market resource allocations are deemed not to be socially optimal.

More specifically, the accounting literature has identified several non-mutually exclusive economic roles of external financial reporting including providing new information to investors and facilitating efficient contracting. Under the information perspective, the optimal firm performance measure is a timely earnings variable which reflects revisions in investors' expectations about future cash flows (Ball 2008). In turn, accounting increases the allocative efficiency of the capital market by allowing investors to make more informed consumption and investment decisions (see Kothari 2001 for a review). The optimal earnings variable under the contracting perspective summarizes verifiable short-term outcomes associated with managerial actions and efforts (Holthausen and Watts 2001). In exchange for a contractible variable that summarizes the firm's ability to meet its contractual obligations, contracting parties agree to grant the firm better terms of trade (Ball 2001). Thus, under the contracting perspective, accounting serves to increase the efficiency of the firms themselves.

In addition to providing new information to investors and facilitating efficient contracting, accounting also disciplines managers' disclosure behavior (Gigler and Hemmer 1998) and improves managerial decision making (Waymire 2009). Each of accounting's multiple economic roles ultimately helps allocate society's scarce resources

towards (away) from firms and projects with the highest (lowest) net present value. I contribute to this literature by showing that accounting also has the potential to affect social welfare outside of a market setting by influencing the measurement of key macroeconomic indicators and shaping monetary policy decisions which regulate the aggregate money supply and alter the growth of the macroeconomy. Thus, accounting's importance in maximizing social welfare by allocating scarce resources to their most efficient uses may be of a higher order than previously thought (i.e. "accounting matters").

Chapter 3: Empirical Design – Accounting Conservatism and Macroeconomic Indicators

3.1 Conservatism and Macroeconomic Indicators – Empirical Overview

My empirical tests are designed to identify whether firm-level accounting conservatism influences the measurement attributes of key macroeconomic indicators and affects monetary policy decisions. I begin by investigating whether firm-level conditional conservatism aggregates to influence the measurement of aggregate corporate profits. My empirical tests focus on conditional (i.e. ex-post or news dependent) conservatism rather than unconditional (i.e. ex-ante or news independent) conservatism for two primary reasons. First, the national economic accounting system does not produce an aggregate corporate sector analog to an individual firm's balance sheet. Second, measurements of the combined market value of the entire U.S. corporate sector (i.e. both public and private firms) are unavailable. Hence, examining unconditional conservatism using traditional market-to-book measures is extremely difficult at the macroeconomic level.[3]

In order to assess conditional conservatism's influence on the measurement of aggregate corporate profits, I adapt Basu's (1997) firm-level asymmetric timeliness regression to accommodate aggregate-level time-series data as follows. First, I use the time-series of annual aggregate corporate profits from 1929 to 2007 compiled by the Bureau of Economic Analysis as the numerator for the dependent earnings variable. Second, I scale aggregate corporate profits by a BEA estimate of aggregate fixed assets owned by public and private firms.[4] Lastly, I require a proxy for news about aggregate

[3] See Beaver and Ryan (2005) for further discussion of the differences between conditional and unconditional conservatism.

[4] Basu (1997) deflates firm-level earnings in the cross-section to reduce heteroskedasticity. In contrast, the primary purpose of deflating the time series of aggregate corporate profits is to reduce any non-stationarity

corporate sector fundamentals in order to determine whether aggregate corporate profits are more sensitive to negative news than to positive news (i.e. whether aggregate corporate profits are conditionally conservative). I form proxies for aggregate corporate sector news using Campbell's (1991) return decomposition framework.

Campbell's (1991) return decomposition framework is advantageous in my setting because it distinguishes between aggregate cash flow news and aggregate discount rate news. Vuolteenaho (2002) demonstrates that firm-level returns are driven primarily by cash flow news. Therefore, bifurcating returns into cash flow and discount rate news may not be critical within firm-level conservatism studies (e.g. Basu 1997). However, prior research demonstrates that cash flow news explains less than one-third of the variation in returns at the aggregate level (Campbell 1991, Campbell and Vuolteenaho 2004). This suggests that cash flow news is largely idiosyncratic and diversified away in the aggregate (Vuolteenaho 2002). Thus, failing to distinguish between cash flow news and discount rate news at the aggregate level could significantly reduce the power of the empirical tests.

3.2 Cash Flow and Discount Rate News – Theory

Campbell's (1991) return decomposition framework utilizes a rational expectations model which relates unexpected aggregate stock returns to changes in investors' expectations about future cash flows and discount rates. The model builds upon the dividend-price ratio model of Campbell and Shiller (1988) which defines the return on an asset (e.g. a stock or a portfolio of stocks) as follows:

in the dependent variable. Using lagged fixed assets as a scalar could also mitigate artificial overstatement of conservatism arising from the use of lagged price as a scalar (Patatoukas and Thomas 2010).

$$r_t = \log\left(\frac{P_t + D_t}{P_{t-1}}\right) \tag{1}$$

Where r_t denotes the gross log return on the asset from the beginning of time t to the beginning of time t+1, P_t is the real price of the asset at the end of time t, and D_t is the real dividend paid on the asset during period t. Equation (1) contains a non-linear relationship because it involves the log of the sum. However, Campbell and Shiller (1988) show that r_t can be approximated using a first-order Taylor expansion of Equation (1) which yields the following:

$$r_t \cong k + \rho p_t + (1-\rho)d_t - p_{t-1} \tag{2}$$

Where k is a constant resulting from the approximation, ρ is a constant discount rate slightly less than one which implies that an increase in expected returns (i.e. discount rates) in the distant future is associated with a smaller drop in today's stock price than an increase in expected returns in the near future, and lowercase letters denote the logs of the corresponding uppercase letters.

Campbell (1991) shows that solving Equation (2) forward for price, imposing a terminal condition that prevents the log dividend-price ratio from growing explosively, and taking expectations yields the following:

$$r_t - E_{t-1}[r_t] = \Delta E_t \sum_{j=0}^{\infty} \rho^j (\Delta d_{t+j}) - \Delta E_t \sum_{j=1}^{\infty} \rho^j r_{t+j} \tag{3}$$

Where $E_t[\ ]$ denotes an expectation at time t, and $\Delta E_t[\ ] = E_t[\ ] - E_{t-1}[\ ]$. Under rational expectations, Equation (3) requires unexpected stock returns to be associated with changes in expectations about cash flows or changes in expectations about future discount rates. In other words, an unexpectedly high (low) current period return implies

that investors raised (lowered) their expectations about future cash flows, lowered (raised) their expectations about future discount rates, or both during the period.

3.3 Cash Flow and Discount Rate News – Empirical Estimation

Because revisions in investors' expectations about future cash flows and discount rates in Equation (3) are not directly observable, Campbell (1991) forms empirical proxies using a vector autoregression (VAR). A vector autoregression is an econometric model that generalizes univariate auto regressive (AR) models and captures the interdependencies between multiple time series. Each variable within the system is allowed to evolve in an unrestricted fashion as a linear function of its own lags and the lags of all the other variables in the model. As a result, vector autoregressions can be estimated without the specification of a structural model which can require multiple identification restrictions. Campbell's (1991) first-order vector autoregression assumes the following functional form:

$$z_t = a + \Gamma z_{t-1} + u_t \tag{4}$$

Where z_t is an mx1 vector of macroeconomic state variables observable to the market by the end of period t, a is an mx1 vector of constant parameters, Γ is an mxm matrix of coefficient estimates, and u_t is an mx1 vector of independent and identically distributed residuals. Campbell (1991) demonstrates that revisions in investors' expectations about future cash flows (*CFNews*) and revisions in investors' expectations about future discount rates (*DRNews*) can be approximated as follows:

$$CFNews_t = (e1' + e1'\rho\Gamma(I - \rho\Gamma)^{-1})u_t \tag{5a}$$

$$DRNews_t = -1 * e1'\rho\Gamma(I - \rho\Gamma)^{-1}u_t \tag{5b}$$

Where $e1$ is an mx1 vector whose first element is one and all other elements are zero, and I is an identity matrix of size m. Positive values of $CFNews_t$ ($DRNews_t$) denote good news, i.e. an increase (decrease) in investors' expectations about future cash flows

(discount rates). Similarly, negative values of $CFNews_t$ ($DRNews_t$) denote bad news, i.e. a decrease (increase) in investors' expectations about future cash flows (discount rates).

The intuition behind the framework is that each state variable realization can be decomposed into an expected component and an innovation component. For example, aggregate stock returns are decomposed into an expected component (i.e. risk) and an innovation component (i.e. news). The remaining state variables, which serve as discount rate proxies, are also decomposed into expected and innovation components. The correlation between unexpected returns and innovations in the discount rate proxies can be used to estimate the portion of current period unexpected returns that is due to current period innovations in the discount rate proxies (i.e. discount rate news). The residual current period unexpected return is attributed to cash flow news in order to avoid directly modeling seasonal dividend payments (Campbell 1991).[5]

I implement Campbell's (1991) VAR methodology using four monthly state variables (i.e. m=4). First, I include the excess of the monthly return on the Center for Research in Securities Prices (CRSP) value weighted index over the risk-free rate (*XRET*). Second, I include the default spread (*DEF*) defined as the difference between the yield on a portfolio of seasoned BAA corporate bonds and the yield on seasoned AAA corporate bonds as measured by Moody's. The intuition behind *DEF* is that the default spread is counter-cyclical and forecasts high (low) returns when economic conditions are weak (strong) (Fama and French 1989). Next, I add the log of the 12-month trailing price-to-earnings ratio on the S&P 500 index (*PE*) because a high (low) price-to-earnings ratio implies low (high) discount rates if earnings growth is held

[5] By directly modeling discount rate news and defining cash flow news as the residual, the cash flow news term inherits any error from misspecification of discount rate news (see Chen and Zhao 2009 and Ball, Sadka, and Sadka 2009). However, any estimation error within my proxy for aggregate cash flow news biases against finding that aggregate corporate profits are more sensitive to negative aggregate cash flow news than to positive aggregate cash flow news.

constant (Campbell and Vuolteenaho 2004). Finally, I include the small stock value spread (*VALUE*) which is the difference between the logs of the book-to-market ratios of small high book-to-market stocks and small low book-to-market stocks. The intuition behind *VALUE* is that high returns to small growth stocks potentially forecasts low aggregate stock returns because (1) small growth stocks generate cash flows farther in the future and are more sensitive to discount rate shocks or (2) small growth firms are more dependent on external financing and sensitive to equity market conditions (Campbell and Vuolteenaho 2004).

3.4 Identifying Conditional Conservatism within Macroeconomic Indicators

I combine the aggregate-level BEA data and proxies for aggregate corporate sector news in the following regression to determine whether the time-series of aggregate corporate profits exhibits conditional conservatism:

$$CP_t / FAPrivate_{t-1} = \theta_0 + \theta_1 CFNews_t + \theta_2 CFNeg_t + \theta_3 CFNews_t * CFNeg_t + \mu_t \quad (6)$$

Where CP_t denotes aggregate corporate profits in calendar year t as compiled by the BEA, $FAPrivate_{t-1}$ represents the net fixed assets owned by all public and private businesses in calendar year t-1 as estimated by the BEA, $CFNews_t$ is the sum of monthly cash flow shocks in calendar year t from the VAR system, $CFNeg_t$ is a dummy variable that equals 1 if $CFNews_t < 0$, and $CFNeg_t$ equals 0 otherwise. A positive and significant θ_3 coefficient in Model (6) would indicate that aggregate corporate profits are more sensitive to negative aggregate cash flow news than to positive cash flow news, consistent with the existence of conditional conservatism at the aggregate level.[6]

[6] My empirical tests focus on the response of aggregate corporate profits to aggregate cash flow news because earnings are meant to provide investors with information about the magnitude, timing, and uncertainty of future cash flows. Inference remains unchanged when including controls for aggregate discount rate news (results untabulated).

Because aggregate corporate profits are a significant component of gross domestic product, I next investigate whether accounting conservatism alters the measurement attributes of GDP signals by estimating the following time-series regression:

$$GDP_t / FATotal_{t-1} = \theta_0 + \theta_1 CFNews_t + \theta_2 CFNeg_t + \theta_3 CFNews_t * CFNeg_t + \mu_t \quad (7)$$

Where GDP_t denotes nominal gross domestic product in year *t*, and $FATotal_{t-1}$ represents the net fixed assets owned by public and private businesses, non-profit institutions, and governments in year *t*-1. A positive and significant θ_3 coefficient in Model (7) would indicate that GDP measurements are more sensitive to negative aggregate cash flow news than to positive aggregate cash flow news.

There are two features of note regarding Models (6) and (7). First, Models (6) and (7) are incomplete specifications for aggregate corporate profits and gross domestic product, respectively. For example, neither specification includes explicit controls for macroeconomic conditions, and measurements of aggregate corporate profits and gross domestic product are likely higher (lower) during macroeconomic expansions (contractions). However, the purpose of Models (6) and (7) is to determine whether the macroeconomic signals are more sensitive to bad news as compared to good news. Importantly, news is uncorrelated with all other variables known at time *t* by definition. Therefore, the omission of possible control variables does not generate omitted correlated variable bias within the parameter estimates provided my proxies for news are well specified.

Second, Models (6) and (7) are macroeconomic analogs to Basu's (1997) asymmetric timeliness regression. A number of studies document concerns with the Basu (1997) approach at the firm level. For example, Beaver and Ryan (2005) and Givoly et al. (2007) show that the Basu (1997) measure can be negatively correlated with other proxies for conservatism. Additionally, Dietrich et al. (2007) and Beaver et al. (2010)

find that test statistics can be misspecified due to endogeneity within the earnings-return relation.

However, I contend that my aggregate-level tests yield valid and useful inferences. Despite the limitations described above, Ryan (2006) asserts that asymmetric timeliness is still the most direct implication of conditional conservatism.[7] Moreover, endogeneity is likely to be less of a concern at the aggregate level because the information within earnings releases for the individual firms is available to the market before the release of the aggregate BEA signal.[8] Finally, as a practical matter, using alternate measures of conservatism is difficult due to the limits of the aggregate-level data. For example, the aggregate-level data published by the BEA is not conducive to adapting firm-level measures of conditional conservatism which require accruals information, book-to-market data, or other detailed financial statement line items.[9]

[7] See also Ball, Kothari, and Nikolaev (2010) for an econometric defense of the Basu (1997) approach.
[8] See also Ball and Shivakumar (2008) who find that information in earnings announcements can explain only a small fraction of firm-level returns, suggesting that reverse causality is not a first-order concern.
[9] See Penman and Zhang (2002), Roychowdhury and Watts (2007), Givoly et al. (2007), Callen, Segal, and Hope (2010), Khan and Watts (2009), and Caskey and Peterson (2010).

Chapter 4: Empirical Design – Accounting Conservatism and Monetary Policy

4.1 Federal Reserve Overview

The remainder of the empirical tests examine whether accounting conservatism influences monetary policy decisions made by the Federal Reserve. The Federal Reserve was formed in 1913 after a series of bank failures, financial panics, business bankruptcies, and economic downturns eroded the public's confidence in the U.S. financial system. The Federal Reserve has many duties including conducting monetary policy, supervising and regulating banks, maintaining the stability of the financial system, containing systemic risk within financial markets, operating the nation's payments system, and providing certain financial services to the U.S. government and foreign official institutions. For a complete overview of the Federal Reserve, see the 2002 Fed publication entitled "*The Federal Reserve System: Purposes and Functions*".

The Federal Reserve is an independent central bank. In other words, Fed decisions do not have to be ratified by any member of the executive branch of the government. However, the Federal Reserve System is subject to oversight by the U.S. Congress who has the power to coin money and set its value according to the Constitution. The Federal Reserve System consists of the Board of Governors in Washington D.C. and twelve regional Federal Reserve Banks in various cities across the country. The Board of Governors consists of seven members appointed by the President and confirmed by the Senate for a term of fourteen years. The Chairman and Vice Chairman positions are also appointed by the President and confirmed by the Senate for a term of four years.

The Federal Reserve's mandate from the U.S. Congress under Section 2a of the Federal Reserve Act of 1913 is to "*promote effectively the goals of maximum employment, stable prices, and moderate long-term interest rates*." In the long run, price stability should help maximize employment and output by allowing prices to serve as clear signals for efficient resource allocation without distortions from inflation. Additionally, stable prices encourage saving and capital formation and prevent the erosion of asset prices due to unanticipated inflation. However, the Federal Reserve often faces short-term tradeoffs when attempting to satisfy its dual mandate. For example, supply shocks (e.g. a poor agricultural harvest or a disruption in the supply of oil) can simultaneously put upward pressure on prices and downward pressure on output and employment. In such cases, the Fed can choose to raise interest rates in order diffuse price pressure at the expense of reduced output and inflation. Alternatively, the Fed could choose an accommodative stance which fosters growth but risks an inflationary spiral (e.g. where the public demands higher wages in expectation of higher prices and a self-fulfilling prophecy results).

The Federal Reserve conducts monetary policy and influences both output and prices using three major tools. First, the Fed conducts open market operations, which consists of buying and selling securities in the open market in order to influence the level of reserves in the depository system. Second, the Board of Governors sets the reserve requirement, which is the percentage of funds that banks and depository institutions must hold in reserve against customer deposits. Third, the Federal Reserve operates the discount window where commercial banks can borrow directly from the Fed at a discount rate set by their regional Federal Reserve Bank and approved by the Board of Governors.

4.2 Monetary Policy Overview

The Federal Reserve's monetary policy tools influence macroeconomic conditions through the supply and demand of bank reserves. The demand for reserves consists of required reserves and excess reserves. Required reserves for each bank in the U.S. are a function of the bank's deposits and the reserve ratio set by the Board of Governors. Banks can hold required reserves in the form of vault cash or balances in accounts with the regional Federal Reserve Bank for their district. Revisions to the reserve ratio are infrequent, and thus required reserves in the system fluctuate mainly with the aggregate level of bank deposits. Banks also use their accounts at their regional Federal Reserve Bank to clear many financial transactions. Because the level of clearing transactions can vary widely, banks typically carry excess reserves at their regional Federal Reserve Bank.

The Federal Reserve supplies reserves through the discount window and open market operations. Banks are generally hesitant to borrow directly from the Fed's discount window because such activity could be seen as a sign of weakness if the activity is found out by the public. As a result, the majority of the supply of reserves comes from non-borrowed reserves. The Fed manages the level of non-borrowed reserves through open market operations. Open market operations are overseen by the Federal Open Market Committee (FOMC) which meets eight times per year. The FOMC consists of the Board of Governors, the president of the Federal Reserve Bank of New York, and presidents of four other Federal Reserve Banks who serve on a rotating basis.

The FOMC can increase the level of non-borrowed reserves by instructing the Domestic Trading Desk at the Federal Reserve Bank of New York to purchase securities in the over-the-counter market. When purchasing securities, the Fed writes a check to the seller of securities (e.g. a private company issuing bonds or the U.S. government issuing Treasury bills). The seller then deposits the check into its local bank, and the local bank will present the check to the Fed for payment. In lieu of actual cash payment to the

seller's bank, the Fed increases the bank's reserve account at its regional Federal Reserve Bank. As a result, the level of reserves for the seller's bank has increased without a decrease in reserves elsewhere. Thus, the overall level of non-borrowed reserves in the system has increased. Just the opposite occurs when the FOMC sells securities (i.e. total non-borrowed reserves decrease because the payment from the buyer reduces the reserves at the buyer's bank without an increase elsewhere).

Banks and depository institutions are also able to trade their reserves. Banks with excess reserves often loan reserves to banks whose reserves fall short of the required amount. These loans are typically overnight loans, and the rate of interest on these loans is known as the federal funds rate. The Federal Reserve does not unilaterally set the federal funds rate. Instead, the federal funds rate changes in response to the supply and demand of reserves. For example, consider when the press reports that the Federal Reserve has increased interest rates. In reality, the FOMC has only increased a target rate for the federal funds rate (i.e. a target for the price of reserves). The FOMC will instruct the Domestic Trading Desk at the Federal Reserve Bank of New York to sell securities in order to reduce the supply of reserves. In turn, banks will find it more expensive to borrow reserves from other banks. As a result, the federal funds rate will increase and approach the target rate until a new equilibrium is reached where the sum of required and excess reserves equals the sum of borrowed and non-borrowed reserves.

Monetary policy has real macroeconomic effects when changes in the federal funds rate affect other interest rates, foreign exchange rates, employment, output, and prices. For example, if the Federal Reserve reduces the supply of reserves in order to curb inflation, then the resulting increase in the federal funds rate can lead to increases in other short-term interest rates on bank loans, Treasury bills, and commercial paper. The increase in short-term rates can also translate into increases in long-term rates on

mortgages, corporate bonds, and Treasury bonds. In turn, demand will decrease for residential housing and durable goods. Moreover, higher interest rates lower the cumulative value of investors' stocks, bonds, and real estate which can further depress aggregate consumption. Finally, changes in interest rates can impact foreign exchange rates. All else equal, higher interest rates in the United States make U.S. dollar denominated debt relatively more attractive to lenders. In turn, demand for U.S. dollars will increase. The increased strength of the U.S. dollar will make imports cheaper for Americans, and the price of U.S. produced goods will increase for consumers in other countries.

4.3 Monetary Policy Rules

As described previously, the Federal Reserve's mandate from the U.S. Congress is to promote maximum employment while maintaining stable prices. Academic monetary policy research often requires translation of the Fed's dual mandate into a formal objective function. Academic research typically characterizes the central banker's problem as the use of some instrument (e.g. an interest rate) together with knowledge of the state of the economy (e.g. the level of prices and output) to stabilize output and prices along some optimal path (Cecchetti 1998). For example, a generalized quadratic central banker loss function can be written as:

$$L = E_t\left(\sum_{i=0}^{h}\beta^i\left(\alpha\left[p_{t+1} - p^*_{t+1}\right]^2 + (1-\alpha)\left[y_{t+1} - y^*_{t+1}\right]^2\right)\right) \qquad (8)$$

Where p_t is the aggregate price level, y_t represents aggregate output, p^* and y^* are the desired levels for prices and output, β is the discount factor, h is the horizon, α is the relative weight given to squared price and output deviations from their desired paths, and E is the expectation operator conditional on the information available at time t. As illustrated in Equation (8), the central banker wishes to minimize the discounted squared deviations of prices and output from their optimal paths. The central banker's problem is

difficult because it is generally not possible to stabilize both output and prices in practice (e.g. lowering interest rates can increase output but also lead to inflation). Thus, central bankers are often forced to make choices between variability in output and variability in prices.

Specifying the optimal levels of output (y^*) and prices (p^*) can yield a policy rule, i.e. a systematic rule for adjusting a policy instrument as the state of the economy fluctuates. Researchers often formulate policy rules by first constructing complex models of the macroeconomy which specify household utility functions, firm production functions, and market imperfections (e.g. wage rigidities) that cause monetary policy actions to have real effects. Researchers can then generate proposed optimal levels of output and prices by either fitting the model to historical data or by parameterizing the model using econometric simulations. See Taylor (1999) for an in-depth review of various macroeconomic models and policy rules.

Perhaps the most prominent monetary policy rule is outlined in Taylor (1993). Taylor's (1993) linear policy rule is formed by applying optimization techniques to a linear stochastic macroeconomic model characterized by rational expectations and price rigidities. Taylor's (1993) original monetary policy rule is as follows:

$$r = p + .5y + .5(p - 2) + 2 \qquad (9)$$

Where r is the federal funds rate, p is the rate of inflation, and y is the output gap. The output gap is the difference between potential GDP (i.e. GDP at full employment) and real GDP. Reaction functions or policy rules that model the federal funds rate as a function of the output gap and inflation are commonly referred to as "Taylor rules." The policy rule suggests that the federal funds rate could be set mechanically based on realizations or forecasts of inflation and the output gap. Thus, in the strictest possible sense, human discretion and the Federal Open Market Committee could be eliminated in

favor of a publicly available algorithm (i.e. a computer) which sets the federal funds rate. See Kozicki (1999), Taylor (1999), and Orphanides (2003) for a review of the development and performance of Taylor rules and for a discussion of the costs and benefits of using mechanical policy rules in practice.

Taylor initially meant his monetary policy rule as a normative prescription for monetary policy (Taylor 2007). More importantly, Taylor (1993) showed that the rule was empirically descriptive of actual monetary policy over his sample period. Taylor's (1993) primary evidence was a visual plot (i.e. not a regression) which showed that the actual federal funds rate closely approximated the proposed optimal federal funds rate using gross domestic product and inflation realizations and the formula in Equation (9). Subsequent research suggests that the relationship continues to hold out of sample (Taylor 2007). These results are consistent with the Fed acting as if it follows the Taylor rule. These results are provocative because presumably the Federal Reserve has an immense amount of data regarding the current state of the economy at its disposal when making monetary policy decisions. However, Taylor (1993) suggests that an observer only needs two parameters (inflation and output) to accurately predict Fed behavior. This result is significant because the "black box" of monetary policy had previously been compared to the mystique of papal successions (Asso et al. 2007).

4.4 The Dollar Value Impact of Accounting Conservatism

Importantly for my study, Taylor (1993) empirically demonstrates that the FOMC utilizes GDP measurements when setting the federal funds rate. Moreover, as described in Chapter 3, firm-level accounting conservatism may aggregate to influence the measurement attributes of aggregate corporate profits and gross domestic product. Therefore, accounting conservatism may influence federal funds rate decisions by altering the GDP measurements upon which the FOMC relies. For example, a central

banker who observes a low realization of GDP could be unsure as to whether increased firm-level accounting conservatism is exacerbating the apparent weakness in macroeconomic fundamentals.

In order to determine whether accounting conservatism influences FOMC decisions, I first estimate the dollar value impact of firm-level accounting conservatism on measurements of aggregate corporate profits and GDP. Directly estimating accounting conservatism's dollar value impact on aggregate corporate profits in a given year is problematic because my sample consists of only 79 observations. Therefore, I use a two-step procedure to maximize statistical power. First, I measure the degree of accounting conservatism within firm-level earnings each year by estimating annual cross-sectional specifications of the Basu (1997) asymmetric timeliness regression:

$$X_{i,t} / MVE_{i,t-1} = \alpha_0 + \alpha_1 R_{i,t} + \alpha_2 Neg_{i,t} + \alpha_3 R_{i,t} * Neg_{i,t} + \delta_{i,t} \quad (10)$$

Where $X_{i,t}$ denotes firm *i*'s income before extraordinary items (Compustat item *ib*) in fiscal year *t*, $MVE_{i,t-1}$ denotes firm *i*'s market value of equity defined as common shares outstanding (Compustat item *csho*) multiplied by stock price (Compustat item *prcc_f*) each as of the end of fiscal year *t*-1, $R_{i,t}$ is firm *i*'s buy-and-hold return in year *t*, $Neg_{i,t}$ is a dummy variable equal to 1 if $R_{i,t} < 0$, and $Neg_{i,t}$ equals 0 otherwise.

Next, I estimate the following time-series regression to determine how scaled aggregate corporate profits are affected by the degree of accounting conservatism within the cross-section of firm-level earnings in a given year:

$$CP_t / FAPrivate_{t-1} = \Phi_0 + \Phi_1 NewsSens_t + \Phi_2 LossRecog_t + \Phi_3 FirmCons_t + \Phi_4 NBER_t + v_t \quad (11)$$

Where $NewsSens_t$ is the sensitivity of firm-level earnings to news in year *t* defined as the α_1 coefficient in year *t* obtained from annual cross-sectional estimations of the Basu (1997) asymmetric timeliness regression outlined in Model (10). $LossRecog_t$ is a

measure of the timeliness with which the cross-section of firm-level earnings recognizes economic losses in year *t* defined as the α_2 coefficient in year *t* obtained from annual estimations of Model (10). $FirmCons_t$ represents the incremental sensitivity of firm-level earnings to bad news as compared to good news in year *t* defined as the α_3 coefficient in year *t* obtained from annual estimations of Model (10). Finally, $NBER_t$ is a dummy variable that equals 1 if a recession as defined by the National Bureau of Economic Research occurred at any time during calendar year *t*, and $NBER_t$ equals 0 otherwise.

The intuition behind Model (11) is as follows. $FirmCons_t$ is the Basu (1997) asymmetric timeliness measure which captures the degree of conditional conservatism within the cross-section of firm-level earnings in year *t*. The Φ_3 coefficient then maps from a measure of firm-level accounting conservatism in year *t* into a measure of accounting conservatism within scaled aggregate corporate profits in year *t*. A negative Φ_3 coefficient would suggest that scaled aggregate corporate profits are lower when firm-level earnings are more conservative.

I keep the fitted value from Model (11) restricting the $FirmCons_t$ variable to equal zero. The resulting fitted value, denoted $\frac{CP_t^*}{FAPrivate_{t-1}}$, represents the predicted value of scaled aggregate corporate profits in year *t* if firm-level earnings were not conditionally conservative. Multiplying by $FAPrivate_{t-1}$ removes the effect of the fixed asset scalar and generates an estimate of aggregate corporate profits in year *t* if firm-level earnings were not conditionally conservative (CP_t^*). Subtracting observed aggregate corporate profits from CP_t^* yields an estimate of the year *t* dollar value impact of firm-level accounting conservatism on measurements of aggregate corporate profits and GDP ($CONS_t$):

$$CONS_t = CP_t^* - CP_t \qquad (12)$$

$CONS_t$ is converted from nominal year *t* dollars into year 2000 dollars using the implicit GDP deflator. Larger positive values denote a greater dollar value impact (e.g. a

$CONS_t$ value of 100 indicates that aggregate corporate profits and GDP would have been approximately $100 Billion higher in the absence of firm-level accounting conservatism).

4.5 Monetary Policy Reaction Functions

Next, I estimate a series of monetary policy reaction functions in order to determine whether accounting conservatism's dollar value impact on measurements of macroeconomic fundamentals affects federal funds rate decisions. As described previously, a monetary policy reaction function is a macroeconomics tool that empirically links a policy instrument (e.g. the federal funds rate) with measurements of a central banker's objectives (e.g. inflation, GDP, unemployment) (Chappell et al. 1993). Following Taylor (1993), my baseline reaction function models the federal funds rate as a function of inflation and the output gap and assumes the following form:

$$FEDFUNDS_t = \beta_0 + \beta_1 GAP1_t + \beta_2 INF_t + \beta_3 VOLCKER_t + \beta_4 POSTVOLCKER_t + \varepsilon_t \quad (13a)$$

Where $FEDFUNDS_t$ is the weighted average of the nominal federal funds rate in year *t*. $GAP1_t$ is a measure of the output gap in year *t* defined as $GDPPotential_t$ - GDP_t. $GDPPotential_t$ is an estimate of potential GDP in year *t* measured in year 2000 dollars from the Congressional Budget Office. GDP_t is the BEA estimate of GDP in year *t* which has been converted from nominal year *t* dollars into year 2000 dollars using the BEA's implicit GDP deflator. INF_t is a measure of inflation in year *t* calculated as the percentage change in the implicit GDP deflator from year *t*-1 to year *t*.[10] $VOLCKER_t$ and $POSTVOLCKER_t$ are fixed effect variables that control for time-invariant unobserved heterogeneity in the process by which the federal funds rate is set across Fed regimes. $VOLCKER_t$ ($POSTVOLCKER_t$) is a dummy variable that equals 1 if Paul Volcker (Alan

[10] Presumably the Fed makes monetary policy decisions based on the current state of the economy and on expectations about the future. However, the Fed's real-time data and internal forecasts are generally proprietary. Romer and Romer (2000) and Sims (2002) show that the Fed's internal forecasts (i.e. the "Green Book") are high quality predictors of ex-post realizations. Thus, researchers usually rely on ex-post realizations to proxy for Fed perceptions about the state of the economy when decisions are made (Orphanides 2004).

Greenspan or Ben Bernanke) was the Chairman of the Federal Reserve in year *t*, and $VOLCKER_t$ ($POSTVOLCKER_t$) equals 0 otherwise.

A negative β_1 coefficient would suggest that the Fed maintains a lower federal funds rate in the presence of a large output gap (i.e. an economy that is operating below its sustainable level). Conversely, a positive β_2 coefficient would suggest that the Fed sets a higher federal funds rate during times of higher inflation. Positive (negative) coefficients on the $VOLCKER_t$ or $POSTVOLCKER_t$ variables would suggest the federal funds rate was systematically higher (lower) during the Volcker or post-Volcker eras compared to the pre-Volcker era, irrespective of macroeconomic conditions.

Next, I modify the baseline reaction function in order to incorporate accounting conservatism's dollar value impact on GDP measurements as follows:

$$FEDFUNDS_t = \Psi_0 + \Psi_1 GAP2_t + \Psi_2 INF_t + \Psi_3 CONS_t + \Psi_4 VOLCKER_t + \Psi_5 POSTVOLCKER_t + \eta_t \quad (13b)$$

Where $GAP2_t$ is a measure of the output gap adjusted for the impact of accounting conservatism defined as $GDPPotential_t$ - (GDP_t + $CONS_t$), and $CONS_t$ is the estimate of the dollar value impact of accounting conservatism on GDP measurements as described by Equation (12). A negative Ψ_3 coefficient would suggest that the federal funds rate tends to be lower when the dollar value impact of firm-level accounting conservatism on GDP estimates is larger.

Chapter 5: Data

All data used in this study are publicly available. Estimates of aggregate corporate profits, aggregate fixed assets, and gross domestic product are obtained from the U.S. Bureau of Economic Analysis. All BEA data used in this study are available at www.bea.gov. I use the latest available estimates for all empirical tests in order to minimize noise arising from estimation error. My empirical tests employ annual estimates (rather than quarterly estimates) for three reasons. First, certain source data is only available on an annual basis, and the BEA must employ statistical extrapolation and make complicated seasonal adjustments to construct quarterly estimates (BEA 2008). Second, the source data underlying quarterly estimates are not as reliable as the source data underlying annual estimates (BEA 2008). Finally, annual data is available beginning in 1929 while quarterly data is only available beginning in 1946 (BEA 2002).

5.1 Overview of National Income and Product Accounts

Aggregate corporate profits and gross domestic product measurements are part of the BEA's National Income and Product Accounts (NIPA). The National Income and Product Accounts are designed primarily to summarize the value and composition of U.S. national output and the incomes generated in the production of that output (BEA 2007a). Moreover, information contained with the National Income and Product Accounts can be used to summarize the sources and uses of national income as well as the sources of saving for investment in future production.

Prior to the development of the National Income and Product Accounts, policy makers during the Great Depression faced incomplete and fragmented economic data (e.g. freight car loadings) when attempting to combat the Great Depression (BEA 2000). In response, the Commerce Department commissioned the development of a system of

national income accounts in the 1930s. The system was expanded in the 1940s in response to the planning needs of World War II and again in the late 1950s and early 1960s in response to the increasing popularity of Keynesian economics. Accelerating inflation in the late 1960s and 1970s led to the development of new price and inflation-adjusted output measures. The National Income and Product Accounts have continued to develop over time in response to the internationalization of trade and the increasing use of technology. Today, the National Income and Product Accounts are widely used in macroeconomics research, and their development has been called one of the greatest inventions of the 20th century (BEA 2000).

The National Income and Product Accounts, along with industry input-output (I-O) accounts prepared by the BEA and flow of funds accounts prepared by the Federal Reserve Board, form the primary elements of today's U.S. national economic accounting system. The system of U.S. economic accounts is designed to present a coherent, comprehensive, and consistent gauge of national economic activity (BEA 2008). Other secondary elements of the U.S. national economic accounting system include the international accounts (e.g. the balance of payments and international investment position accounts), the regional accounts (e.g. gross domestic product by state, personal income by state, and local area personal income), and U.S. Bureau of Labor Statistics estimates of productivity for the U.S. economy.

The 2008 publication "*Concepts and Methods of the U.S. National Income and Product Accounts*" outlines the BEA's conceptual framework. The BEA's conceptual framework is based on the System of National Accounts, an internationally accepted conceptual framework for the compilation of national statistics formulated in 1993 (BEA 2007a). Financial accounting predates the practice of national economic accounting, which has led national economic accounting to be based on many of the same

fundamental principles adopted in financial accounting (BEA 2007a). For example, both systems are based on double-entry and accrual principles. However, differences between the two fields exist. For example, financial accounting practice often values assets at historical costs because historical costs are regarded as objective, verifiable, and relatively conservative. In contrast, national economic accounting employs more current cost estimates because they serve as the best approximation to the economic notion of opportunity costs (i.e. the foregone benefits that could have been secured with the next best alternative use of an asset).

The BEA considers four characteristics when constructing estimates for the National Income and Product Accounts (BEA 2008). First, the BEA strives for accuracy (i.e. for estimates that closely measure the underlying theoretical construct). Second, the BEA desires reliability (i.e. small and infrequent revisions to initial estimates). Third, the BEA pushes for relevancy (i.e. for timely estimates that help answer questions about the pace of production, the relation between the trade deficit and economic growth, and the pattern of spending on goods and services). Finally, the BEA attempts to maintain integrity (i.e. estimates are designed to reflect the best methods and judgments without political or other outside influences).

Similar to the Financial Accounting Standard Board's own conceptual framework, the BEA has formalized definitions for assets (i.e. anything owned by some unit from which economic benefits are derived by their owners by holding or using them) and income (i.e. the amount arising from current production that an entity can spend without reducing its net worth). The BEA has also defined the production boundary (i.e. which human activities are defined as production), geographic boundaries (e.g. whether to measure the value of goods and services produced by labor and capital located in the United States or by U.S. residents regardless of location), differences between gross and

net measures (i.e. whether or not measures include a charge for depreciation), and saving (i.e. the portion of current income set aside rather than consumed). Finally, similar to current debates within the accounting profession, economists at the BEA are concerned with how to measure and present the value of assets in the absence of clearly defined market prices (e.g. owner-occupied housing).

The National Income and Product Accounts consist of seven summary accounts supported by hundreds of detailed tables (BEA 2008). A brief description of each summary account is as follows. Account 1 (*Domestic Income and Product Account*) aggregates the underlying production accounts for domestic sectors of the U.S. economy. Aggregate corporate profits and GDP data used in the empirical tests are prominent elements of Account 1 which presents the total final output produced in the nation and the incomes generated as a result of its production. Account 2 (*Private Enterprise Income Account*) provides additional information on the sources and uses of the income of private businesses. Account 3 (*Personal Income and Outlay Account*) shows the sources and uses of income received by persons (e.g. individuals and private trust funds). Account 4 (*Government Receipts and Expenditures Account*) summarizes transactions of federal, state, and local governments. Account 5 (*Foreign Transactions Current Account*) presents information on receipts and payments associated with foreign trade and other transactions not involving transfers of assets. Account 6 (*Domestic Capital Account*) presents information on national saving and investment. Account 7 (*Foreign Transactions Capital Account*) presents information on capital transactions with foreigners that are linked to the acquisition or disposition of assets.

National Income and Product Summary Accounts 1, 2, and 3 combine to present nationwide information loosely analogous to an income statement and statement of retained earnings for a firm under GAAP. Account 6 is loosely analogous to a national

statement of cash flows (BEA 2007a). Accounts 4, 5, and 7 deal with government and foreign transactions, and thus these accounts don't have a corresponding statement within GAAP. The National Income and Product Accounts are mainly flow-based, and the BEA does not construct direct stock-based analogs to a GAAP balance sheet.

5.2 Aggregate Corporate Profits

Within the National Income and Product Accounts, aggregate corporate profits represent the pre-tax sum of profits from current production earned by all entities required to file a federal tax return (BEA 2002). The BEA uses both publicly available external financial reporting data and proprietary income tax return data from the Internal Revenue Service (IRS) when compiling aggregate corporate profits. The BEA uses both data sources because neither source is individually sufficient to produce a timely summary measure of profits for all firms (BEA 2002, Himmelberg et al. 2004).

The advantage of using proprietary IRS data is that it covers both public and private firms (BEA 2002). Specifically, totals are tabulated for all active corporations with more than $50 million of assets and for stratified samples of smaller firms included within the population covered by the Internal Revenue Service's Statistics of Income calculations. However, the disadvantage of using tax return data is that tax returns are only available annually with a lag. In contrast, GAAP data are available for only a subset of firms, but the data are available on a quarterly basis. Furthermore, there are additional tradeoffs associated with each underlying data source. For example, external financial reporting data are generally audited while IRS data is not, but firms have less flexibility in reporting income for tax purposes which increases uniformity across firms (BEA 2004).

The specific mix of GAAP and tax data used for a firm depends on the firm's principal business activity. Firms declare their principal business activity on their tax

return, and the principal business activity codes used by the IRS are similar in format and structure to Standard Industrial Classification (SIC) codes (BEA 2002). GAAP and related financial data forms the basis of the BEA's estimate of corporate profits for firms in the following industries: services, trucking, warehousing, communication, gas and electric utilities, security and commodity brokers, life insurance carriers, real estate, credit agencies, agriculture, construction, transportation, insurance, and pipelines. IRS data forms the basis of the BEA's estimate of corporate profits for firms in the mining, manufacturing, wholesale and retail trade industries. Finally, income tabulated from reports filed with regulatory agencies form the basis of the BEA's estimate of corporate profits for railroads, airlines, and banks. See the 2002 BEA publication entitled *Corporate Profits: Profits Before Tax, Profits Tax Liability, and Dividends Methodology Paper* for further discussion of the source data underlying the BEA's measure of aggregate corporate profits.

The BEA makes a variety of adjustments to the underlying source data. These adjustments are meant to generate an accrual accounting based estimate of aggregate corporate profits that is consistent with the BEA's notion of economic income, free from changes in GAAP and tax laws, and consistent across time (BEA 2004, BEA 2007a, Landefeld et al. 2008). Two of the most significant adjustments are the inventory valuation and capital consumption adjustments. The inventory valuation adjustment restates cost-of-goods sold expense as if inventories were valued at current cost. The capital consumption adjustment bases asset service lives on uniform and empirically based estimates and restates depreciation expense to a current-cost basis. The resulting depreciation expense is meant to approximate the amount that would need to be saved to replace fixed assets as they are used up during production.

See Appendix A for a more complete description of the differences in accounting methods between Generally Accepted Accounting Principles, the Internal Revenue Code, and the National Income and Product Accounts. The majority of the differences appear to bias against finding conditional conservatism at the aggregate level. For example, conditionally conservative lower of cost or market inventory writedowns are removed from BEA estimates of aggregate corporate profits.

In order to balance providing timely yet accurate estimates, the BEA uses a release cycle for most NIPA estimates including aggregate corporate profits (BEA 2008). The first estimate of aggregate corporate profits for calendar year *t* is generally released in July of year *t*+1. This "first July estimate" is largely based on GAAP financial statements and U.S. Census Bureau data. The release for year *t* also includes revisions to estimates for year *t*-1 (the "second July estimate") which incorporates preliminary IRS data. Finally, the release for year *t* includes revisions to estimates for year *t*-2 (the "third July estimate") which incorporates the final IRS data. The time-series of aggregate corporate profits with inventory valuation and capital consumption adjustments measured in nominal year *t* dollars used in the empirical tests is obtained from Line 17 of NIPA Table 1.7.5.

5.3 Gross Domestic Product

Aggregate corporate profits are a significant component of gross domestic product, i.e. the market value of the final goods and services produced by labor and property in the United States (BEA 2008). GDP is the BEA's primary summary measure of economic activity, but GDP is not a measure of economic well-being (BEA 2007b). In other words, GDP does not consider social welfare issues such as rates of crime, poverty, or literacy.

The BEA measures GDP in three distinct ways; see Figure 1 for a graphical depiction of the alternative measurement methodologies. First, the BEA uses an "expenditures approach" to measure the value of goods and services sold to final users. This approach sums personal consumption expenditures (i.e. the value of the goods and services purchased by individuals), gross private fixed investment (i.e. additions and replacements to the stock of private fixed assets excluding depreciation), changes in private inventories (i.e. the change in the physical volume of inventories owned by private businesses), net exports of goods and services (i.e. the value of exports less imports), and government consumption expenditures and gross investment (i.e. spending and investment by governments in order to produce and provide goods and services to the public). See Appendix B for an illustration of the expenditures approach for measuring GDP using the 2006 values for National Income and Product Account Table 1.1.5.

Second, the BEA measures the income derived from the sale of final goods and services. This "income approach" includes employee compensation (i.e. wages, salaries, and employer contributions for employee pensions, insurance, and government social insurance), taxes on production and imports (i.e. federal excise taxes and state and local sales taxes), net operating surplus (i.e. aggregate corporate profits plus current government surpluses or deficits), and the consumption of fixed capital (i.e. economic depreciation) less subsidies (i.e. monetary grants by government agencies to private business). See Appendix C for an illustration of the income approach using the 2006 values for National Income and Product Account Table 1.10.

Third, the BEA sums the value added at each stage of production. This "production approach" defines gross value added as the country's gross output less the value of intermediate goods. Gross value added is calculated by first finding the difference between each industry's total output and its intermediate purchases from other

industries. Intermediate purchases and sales are eliminated once value added is aggregated across all industries. The remainder is industry sales to final users, or gross value added.

The three measurement approaches are theoretically equivalent. For illustration purposes, consider a simple one-period economy with three individuals. Robert is endowed with some amount of lumber, Ross is endowed with tools and $100 of currency, and Bill is endowed with $200 of currency. During the period, Robert sells all of his lumber to Ross for $100. In turn, Ross uses his tools, the acquired lumber, and his own labor to manufacture a desk. Finally, Ross sells the desk to Bill for $200. Under the expenditures approach, the GDP for this simple economy would be equal to $200 (i.e. the market value of the desk). The lumber in this example is an intermediate good, and thus the value of the lumber is included in the market value of the final desk. Under the income approach, Robert earned $100 on the sale of the raw lumber and Ross earned $100 of profit upon the sale of the finished desk for a total gross domestic income of $200. Thus, the gross domestic income for the economy was equal to the gross domestic product.

In practice, estimates of gross domestic product, gross domestic income, and gross value added vary slightly due to differences in estimation techniques and underlying source data (BEA 2007a, 2008). The univariate Pearson and Spearman correlations between gross domestic product and gross domestic income exceed 0.99 in my sample. The results of all empirical tests utilizing gross domestic product estimates are quantitatively and qualitatively similar when using gross domestic income.

The BEA uses a variety of data to construct GDP estimates including survey data from the U.S. Census Bureau, the Bureau of Labor Statistics, the Office of Management and Budget, the Department of the Treasury, and the Department of Agriculture.

Additionally, the BEA utilizes information from state and local governments (e.g. data on regulated public utilities and building permits) as well as data from trade associations, businesses, international organizations, and BEA surveys on international direct investment when compiling estimates for the National Income and Product Accounts. For a full description of all gross domestic product source data, see BEA (2008) and Landefeld et al. (2008).

For annual GDP estimates, the first estimate for calendar year *t* is published in the summer of year *t*+1. Each annual GDP release also revises previous estimates for year *t*-1 and *t*-2. These annual revisions incorporate recently available and revised annual source data including Census Bureau surveys, IRS tabulations of income tax returns, and tabulations of employment and wages from the Bureau of Labor Statistics. The BEA also does a comprehensive revision of each annual GDP estimate after 5 years to incorporate the most accurate census data available (BEA 2007b). Annual estimates of GDP measured in nominal year *t* dollars are obtained from Line 1 of NIPA Table 1.7.5.

5.4 Adjustments for Price Level Changes

The annual estimates of aggregate corporate profits and gross domestic product described above are measured in current year *t* dollars. In other words, all estimates reflect aggregated transactions in terms of their value in the periods in which they take place. As a result, changes over time in the current-dollar measures can reflect a change in quantity, a change in price, or a combination of both. In order to separate these effects, the BEA derives annual changes in quantities and prices using a Fisher formula with weights from adjacent years. These annual changes are "chained" (i.e. multiplied) together to form time series of quantity and price indices. The chained approach is computationally difficult, and the level of an index in any single period is not in itself meaningful. However, the relation of an index level to an index level in another period

can be used to create inflation-adjusted aggregate measures (BEA 2008, Landefeld et al. 2008).

Current dollar estimates (instead of real measures) are used within the empirical tests for multiple reasons. First, the BEA does not provide real (i.e. price-adjusted) estimates of aggregate corporate profits (BEA 2002). Thus, creating an inflation adjusted measure of aggregate corporate profits would require the use of a proper price scalar, which is difficult because price indices generally cannot be associated with income measures in the same fashion as product measures (BEA 2002). Moreover, a fundamental problem when adjusting aggregate estimates for inflation is that there is not a single inflation measure. Instead, prices for a wide spectrum of goods and services are changing relative to one another over time (BEA 2008). Therefore, the method of aggregating prices for individual components can significantly impact the resulting composite index.

Furthermore, there is some debate as to the optimal measure of inflation. One commonly used measure of inflation in the U.S. economy is the percent change in the price index for gross domestic purchases, which measures the prices of goods and services purchased by U.S. residents across the world. In contrast, the price index for gross domestic product measures the prices of goods and services produced in the United States. Other prominent aggregate inflation measures produced by the Bureau of Labor Statistics include the Consumer Price Index, the Producer Price Index, the Personal Consumption Expenditures Price Index, and various international price indices. Moreover, variants of the above price indices known as “core inflation” measures exclude volatile food and energy prices.

Finally, price-adjusted output measures produced by the BEA (e.g. real gross domestic product) may continue to exhibit non-stationarity. For example, gross domestic

product has historically increased over time due to technological progress and gains in efficiency even after controlling for inflation. Therefore, even using real measures of output could require additional econometric remedies for non-stationarity.

Due to the problems with price-adjusted aggregate data described above, aggregate corporate profits and GDP estimates are instead scaled by nominal aggregate fixed assets when used as a dependent variable within a regression in order to eliminate the impact of inflation and generate stationary variables. Estimates of the net fixed assets owned by public and private businesses (plus non-profit institutions and governments) are obtained from Line 3 (Line 2) of BEA Fixed Asset Table 1.1. These estimates, measured in billions of nominal year *t* dollars, are constructed from U.S. Census Bureau survey data and approximate the current-cost value of net fixed assets used in production for more than one year (BEA 2003).

5.5 Other Data

All other data used in this study are also publicly available. Monthly risk free rates, monthly price levels for the S&P 500 index, and return data are obtained from Wharton Research Data Services. Federal funds rate data and monthly yields on AAA and BAA corporate bonds are from Federal Reserve Statistical Release H.15 available at www.federalreserve.gov. Monthly S&P 500 earnings data are available on Professor Robert Shiller's website at www.econ.yale.edu/~shiller/data.htm. Book-to-market ratio and return data for six portfolios formed on size and book-to-market are available on Professor Kenneth French's website at http://mba.tuck.dartmouth.edu/pages/faculty/ken.french/data_library.html. Estimates of potential GDP measured in year 2000 dollars are obtained from the Congressional Budget Office at www.cbo.gov. Implicit GDP deflator data used to construct proxies for inflation are obtained from Line 1 of BEA NIPA Table 1.1.9.

Aggregate taxable income data are obtained from Column 3 of Internal Revenue Service Statistics of Income (SOI) Table 15 at http://www.irs.gov/taxstats/. Industrial production and University of Michigan consumer sentiment data are obtained from the Federal Reserve Economic ("FRED") database at http://research.stlouisfed.org/fred2/. Data on residential housing starts are obtained from the U.S. Census Bureau at http://www.census.gov/. Unemployment data is obtained from the U.S. Bureau of Labor Statistics at http://bls.gov/data/. Finally, start and end dates for recessions are obtained from the National Bureau of Economic Research at http://www.nber.org/cycles.html.

Chapter 6: Results – Accounting Conservatism and Macroeconomic Indicators

Table 1 presents descriptive statistics and parameter estimates for the vector autoregression system used to construct proxies for news about aggregate corporate sector fundamentals. Parameter estimates within the first row of Panel B suggest that three of the four macroeconomic state variables contain predictive power for future aggregate excess returns. First, the positive and significant coefficient on $XRET_{t-1}$ of 0.122 is consistent with momentum within aggregate returns. Second, the positive coefficient on DEF_{t-1} of 0.528 is consistent with prior studies that find a positive correlation between the default spread and future aggregate returns (Fama and French 1989). Third, the negative and significant coefficient on PE_{t-1} of -0.012 is consistent with prior research demonstrating that larger aggregate price-to-earnings ratios predict lower future aggregate returns (Campbell and Vuolteenaho 2004). Finally, the adjusted R^2 of 3% for the aggregate return equation and the remaining VAR results are all generally consistent with prior research (see Campbell and Vuolteenaho 2004).

Table 2 presents descriptive statistics for the aggregate-level variables used to identify conditional conservatism within select macroeconomic indicators. Aggregate corporate profits, gross domestic product, and aggregate fixed assets are measured in billions of nominal year *t* dollars. Augmented Dickey-Fuller test statistics for these unscaled variables indicate failure to reject the null hypothesis of a unit root, consistent with a time trend due to inflation. The mean and median values for the unscaled variables are not particularly informative given the time trend. However, the raw values demonstrate the economic magnitude of the quantities involved. For example, aggregate corporate profits compiled by the BEA totaled $1.6 Trillion in 2007, and GDP for the

year totaled $13.8 Trillion. For perspective, the summation of GAAP earnings for all firms on Compustat in 2007 totaled approximately $688 Billion.

In order to eliminate the impact of inflation and generate stationary variables, aggregate corporate profits and GDP estimates are scaled by aggregate fixed assets when used as a dependent variable within a regression. Within Table 1, augmented Dickey-Fuller test statistics for each of the scaled variables suggest rejection of the null hypothesis of a unit root in favor of the alternative hypothesis of a stationary time-series. The mean and median value for scaled aggregate corporate profits of 0.05 suggests that aggregate return on fixed assets for the entire corporate sector is approximately 5%. Similarly, the mean and median value for scaled GDP of 0.37 indicates that the U.S. economy produces goods and services with a final market value of $0.37 for each dollar of assets owned by businesses, non-profit institutions, and governments.

Table 2 also shows that the mean value for the *CFNews* (*CFNeg*) variable is 0.00 (0.46). These first moment statistics are consistent with my proxy for aggregate cash flow news approximating a uniformly distributed random variable with mean zero, as desired. Moreover, the mean *CFNeg* value of 0.46 indicates that the 46% of sample years characterized as "bad news" observations are not limited to recessions or anomalies like the Great Depression. Finally, augmented Dickey-Fuller test statistics show that the aggregate news variables are stable over time.

Table 3 presents the results of the aggregate-level time-series regressions designed to determine whether aggregate corporate profits and GDP estimates exhibit conditional conservatism. Based on firm-level conservatism studies (e.g. Basu 1997), one may expect a positive coefficient on the main effect news variable (*CFNews*). However, the θ_1 coefficients in both Models (6) and (7) are indistinguishable from zero. Two possible explanations for the discrepancy between the firm-level and the aggregate-

level results for the main effect variable are as follows. First, recent firm-level conservatism studies (e.g. LaFond and Watts 2008) generate a positive and significant main effect coefficient by estimating Fama-MacBeth (1973) regressions by year. However, such cross-sectional econometric treatments are not possible with the pure time-series data in my study. Second, firm-level conservatism studies typically utilize large panel data sets with thousands of firm-year observations. In contrast, my study has only 79 observations for one macroeconomic unit (i.e. the U.S. economy). Such short time series are typical within the empirical macroeconomics literature, and I likely have less statistical power compared to firm-level studies within the accounting literature.

Turning to the variables of interest, the θ_3 coefficient on the $CFNews_t*CFNeg_t$ interaction term of 0.100 within Model (6) is significantly positive. This result suggests that aggregate corporate profits are more sensitive to negative aggregate cash flow news than to positive aggregate cash flow news. Similarly, the significantly positive θ_3 coefficient of 0.211 within Model (7) suggests that GDP estimates are more sensitive to negative aggregate cash flow news than to positive aggregate cash flow news. This asymmetric response of aggregate corporate profits and GDP to negative aggregate cash flow news as compared to positive aggregate cash flow news is consistent with firm-level accounting conservatism aggregating to influence the measurement attributes of key macroeconomic indicators. Moreover, these results suggest that the behavior of macroeconomic signals based, in part, on financial reporting data resembles the conditionally conservative behavior of a representative firm's earnings, despite a lack of central authority or coordination between firms.

I perform multiple robustness checks in an attempt to show that the conservatism within aggregate corporate profits and GDP is a function of the conservatism within firm-level GAAP earnings. First, I replicate Model (6) using aggregate GAAP-based

Compustat earnings as the dependent variable. Panel A of Table 4 shows that the θ_1 coefficient is positive and significant, but the θ_3 coefficient of interest is not statistically different from zero. The insignificant θ_3 coefficient indicates a failure to reject the null hypothesis of no conditional conservatism within aggregate Compustat earnings.

However, aggregated Compustat earnings are only available beginning in 1962, whereas BEA data is available back to 1929. Hence, the Compustat sample consists of only 46 observations, which is 42% smaller than the BEA sample. In order to investigate a lack of power as an explanation for the insignificant interaction coefficient in Panel A, I re-estimate Model (6) using BEA data over the Compustat sample period. The results presented in Panel B of Table 4 show an insignificant θ_3 coefficient for the BEA data in the reduced sample. Because the θ_3 coefficient for the BEA data is positive and significant in the unrestricted sample in Table 3, the failure to identify conditional conservatism within aggregate Compustat earnings may be attributed to Compustat's limited sample period.

Second, I attempt to rule out the BEA's use of aggregated tax data as the source of the conservatism within aggregate corporate profits and GDP. Accordingly, I replicate Model (6) using aggregate taxable income as tabulated in the Internal Revenue Service's Statistics of Income tables as the dependent variable. The lack of a significant interaction coefficient in Table 5 indicates failure to reject the null hypothesis of no conditional conservatism within aggregate IRS taxable income. This result is consistent with the conservatism within aggregate corporate profits and GDP being a function of the conservatism within firm-level GAAP earnings rather than a function of the BEA's use of tax source data. However, aggregated IRS data is only available back to 1960, and thus I cannot rule out insufficient power as an explanation for the lack of a significant interaction coefficient in Table 5.

In summary, the results in this section show that aggregate corporate profits and GDP are more sensitive to negative aggregate cash flow news than to positive aggregate cash flow news. This asymmetric sensitivity is consistent with firm-level accounting conservatism aggregating to influence the measurement attributes of key macroeconomic indicators. However, data limitations prevent me from definitively isolating the asymmetric timeliness within firm-level GAAP earnings as the source of the asymmetric timeliness within aggregate corporate profits and GDP. Thus, my results are subject to the caveat that the asymmetric timeliness identified within the macroeconomic indicators may arise from an alternative source (e.g. the inclusion of both public and private firms in the population, differences in accounting methods between GAAP and the national economic accounts, or the BEA's use of both GAAP and IRS source data). However, all subsequent estimates of the dollar value impact of firm-level conservatism on measurements of macroeconomic fundamentals and the results from the associated monetary policy tests are robust and based on established measures of accounting conservatism utilizing firm-level GAAP data (e.g. Basu 1997).

Chapter 7: Results – Accounting Conservatism and Monetary Policy

The remaining results provide evidence as to whether accounting conservatism's influence on macroeconomic indicators affects federal funds rate decisions made by the U.S. Federal Reserve. As described above, I quantify accounting conservatism's dollar value impact on aggregate corporate profits by first estimating annual cross-sectional specifications of Model (10). Figure 2 plots the resulting annual α_3 coefficients which can be interpreted as the degree to which the cross-section of firm-level earnings responds more to bad news than to good news. The plot shows that the degree of accounting conservatism within firm-level earnings exhibits significant time-series variation, and the general upward trend is consistent with research which finds that accounting conservatism has increased over time (Givoly and Hayn 2000, Beaver and Ryan 2009).

Table 6 presents the results of regression Model (11) which examines how the time-series of aggregate corporate profits reacts to the degree of conditional conservatism within the cross-section of firm-level earnings. The negative and significant Φ_3 coefficient of -0.023 on the $FirmCons_t$ variable (i.e. the α_3 coefficient plotted in Figure 2) suggests that scaled aggregate corporate profits are lower when firm-level earnings are more conservative. Similarly, the negative and significant Φ_4 coefficient of -0.008 on the *NBER* variable suggests that scaled aggregate corporate profits are lower during recessions. Keeping the fitted value from Model (11) where $FirmCons_t$ is restricted to zero and multiplying by aggregate fixed assets generates an estimate of aggregate corporate profits as if firm-level earnings were not conditionally conservative (CP_t^*). Subtracting observed aggregate corporate profits from CP_t^* yields an estimate of the year *t* dollar value impact of firm-level accounting conservatism on estimates of aggregate

corporate profits and GDP ($CONS_t$). Figure 2 shows that the significant time-series variation in *CONS* closely mimics the time-series variation in the degree of conservatism within firm-level earnings. This suggests that *CONS* is not merely noise or estimation error. Moreover, the upward trend in *CONS* is consistent with an increase in accounting conservatism over time (Givoly and Hayn 2000, Beaver and Ryan 2009).

I also perform validity checks on my proxy for the dollar value impact of firm-level accounting conservatism on aggregate corporate profits and GDP. First, I explore whether the degree of conservatism within the cross-section of firm-level earnings varies according to the business cycle. Table 7 presents the results from re-estimating regression Model (10) with the addition of dummy variables and interaction terms for whether the firm-year observation occurred before, during, or after a recession. The positive and significant α_3 coefficient on the *PreNBER* dummy variable suggests that firm-level earnings tend to be higher in the year before recessions. More importantly, the positive and significant α_7 and α_8 coefficients suggest that firms tend to report more conservatively both before and during recessions. Moreover, the negative and significant α_9 coefficient suggests that firms report less conservatively after recessions. These results are notable for two reasons. First, movement through the business cycle may drive systematic changes in firms' conservatism outcomes (i.e. the business cycle may act as a coordination mechanism). Second, the results in Table 7 may raise the concern that *CONS* is simply a proxy for the business cycle rather than a proxy for the dollar value impact of firm-level conservatism on macroeconomic indicators.

In order to further investigate the impact of the business cycle on the *CONS* variable, I estimate univariate correlations between *CONS* and select macroeconomic indicators. The results in Table 8 show that *CONS* is not significantly correlated with the return on the CRSP value-weighted index (*EQUITY*), the number of new residential

housing starts as measured by the U.S. Census Bureau (*HOUSING*), the University of Michigan Consumer Sentiment index (*CONSUMER*), the unemployment rate of the civilian non-institutional population as measured by the U.S. Bureau of Labor Statistics, or recessions as defined by the National Bureau of Economic Research (*NBER*). Table 8 shows that *CONS* is significantly negatively correlated with the percentage change in the Federal Reserve's Industrial Production and Capacity Utilization index (*INDPRO*). However, industrial production is an output based indicator that is highly correlated with GDP. Therefore, a negative correlation between *CONS* and *INDPRO* is not surprising given the results in Table 6 which show that aggregate corporate profits (and thus GDP) are negatively correlated with the degree of conditional conservatism within firm-level earnings.[11] Overall, the results in Table 8 suggest that *CONS* is free from omitted correlated variable bias arising from the business cycle. Taken together, the results in Figure 2 and Table 8 suggest that my estimates of the dollar value impact of firm-level accounting conservatism on aggregate corporate profits and GDP are reasonable.

Table 9 presents descriptive statistics for the variables used within the monetary policy reaction functions designed to determine whether accounting conservatism's dollar value impact on measurements of macroeconomic fundamentals affects federal funds rate decisions. The mean *FEDFUNDS* value of 5.735 indicates the federal funds rate set by the Fed averages 5.7% over the sample period. The mean *GAP1* value of 1.544 suggests that real economic output averages approximately $1.5 Billion less than the level of output that could be obtained if the economy was operating at its highest sustainable level. This small average output gap suggests that the Federal Reserve is fairly adept in promoting output and employment, which is one half of the Fed's mandate. However, maintaining a small output gap has a cost in the form of a mean annual inflation rate

[11] The results of all subsequent monetary policy tests are robust to the inclusion of controls for industrial production (results untabulated).

(*INF*) of 3.1%. The mean *CONS* value of 114.412 suggests that GDP would have averaged approximately $114 Billion higher in the absence of accounting conservatism. As a result, the mean output gap adjusted for the impact of accounting conservatism (*GAP2*) of -109.518 suggests that real economic output exceeds the sustainable output level by an average of $109.5 Billion (i.e. the economy appears "overheated"). Augmented Dickey-Fuller tests statistics suggest that the *FEDFUNDS*, *GAP1*, *GAP2*, and *INF* variables are all stationary. The null hypothesis of a unit root for *CONS* cannot be rejected, which is consistent with an increase in the dollar value impact of accounting conservatism on GDP measurements as the economy grows over time.

Table 10 presents parameter estimates for the monetary policy reaction functions. Model (13a) represents a baseline reaction function following prior research. The negative and significant β_1 coefficient on *GAP1* of -0.007 suggests that the Federal Open Market Committee sets the federal funds rate 0.7 basis points lower for every $1 Billion of output gap (i.e. the FOMC maintains lower interest rates when the economy has "room to grow"). In contrast, the positive and significant β_2 coefficient on *INF* of 1.003 suggests the FOMC sets the federal funds rate 1.003% higher for every 1% of inflation. The positive and significant β_3 (β_4) coefficient on the *VOLCKER* (*POSTVOLCKER*) fixed effect variables of 5.357 (1.454) suggests the federal funds rate was approximately 5.4% (1.5%) higher during the Paul Volcker (Alan Greenspan or Ben Bernanke) chairmanship as compared to the pre-Volcker era, irrespective of the output gap and the inflation rate. The adjusted R^2 of 78% suggests that the baseline reaction function can explain a significant portion of federal funds rate decisions. Overall, these results are consistent with prior research (Taylor 1993, Kozicki 1999, Ball and Tchaidze 2002).

Table 10 also presents the results of Model (13b) which modifies the baseline reaction function to incorporate accounting conservatism's dollar value impact on GDP

measurements. The coefficients on *INF* and the adjusted output gap (*GAP2*) are consistent with the corresponding coefficients within the baseline reaction function. With respect to the variable of interest, the negative and significant Ψ_3 coefficient on *CONS* of -0.015 indicates that the federal funds rate tends to be lower when the dollar value impact of firm-level accounting conservatism on GDP measurements is larger.

Macroeconomics research typically estimates monetary policy reaction functions like Models (13a) and (13b) in levels for two reasons. First, theoretical models of the central banker's task often generate testable predictions specified in levels. Second, explanatory power is typically greater for reaction functions specified in levels. However, media outlets, investors, and decision makers may be more focused on changes in output, inflation, and the federal funds rate rather than on the levels themselves. Thus, I re-estimate Models (13a) and (13b) using changes specifications. Table 11 shows that all inferences from the levels analysis in Table 10 hold in the changes analysis. Most notably, the negative and significant coefficient on Δ*CONS* of -0.012 in Panel B suggests that changes in the dollar value impact of firm-level conservatism on GDP are negatively associated with changes in the federal funds rate.

Chapter 8: Conclusion

This study investigates the macroeconomic consequences of firm-level accounting conservatism. Consistent with conditional conservatism extending to the aggregate level, I demonstrate that annual estimates of aggregate corporate profits and gross domestic product from 1929 to 2007 compiled by the U.S. Bureau of Economic Analysis are more sensitive to negative aggregate cash flow news than to positive aggregate cash flow news. Next, I estimate the dollar value impact of firm-level accounting conservatism on measurements of macroeconomic fundamentals. Finally, I show that the federal funds rate set by the U.S. Federal Reserve tends to be lower when the dollar value impact of firm-level accounting conservatism on gross domestic product measurements is larger.

These results should be of interest to researchers and a variety of capital market participants. First, my results suggest that accounting can affect social welfare by influencing the measurement of key macroeconomic indicators and shaping monetary policy decisions which regulate the money supply and alter macroeconomic growth. Second, understanding how firm-level accounting measurements interact with the national economic accounts is important because changes in accounting standards or practice (e.g. the increased use of fair value measurements and the proposed convergence between GAAP and IFRS) could alter the measurement of aggregate fundamentals and lead to unintended macroeconomic consequences. Lastly, increased government regulation and intervention in global capital markets calls for research which examines how central planners, regulators, and other macroeconomic units use accounting measurements when making economic decisions outside of pure market settings.

The results of this study are meant to be strictly positive, and I refrain from making normative statements. For example, I make no normative statements regarding

the value of accounting conservatism for two reasons. First, determining whether accounting conservatism's impact on macroeconomic indicators and monetary policy decisions is socially desirable would require specifying an objective function for the whole of society which is naturally quite difficult. Second, any single study is unlikely to be able to simultaneously weigh all of the firm-level and aggregate-level costs and benefits associated with accounting conservatism.

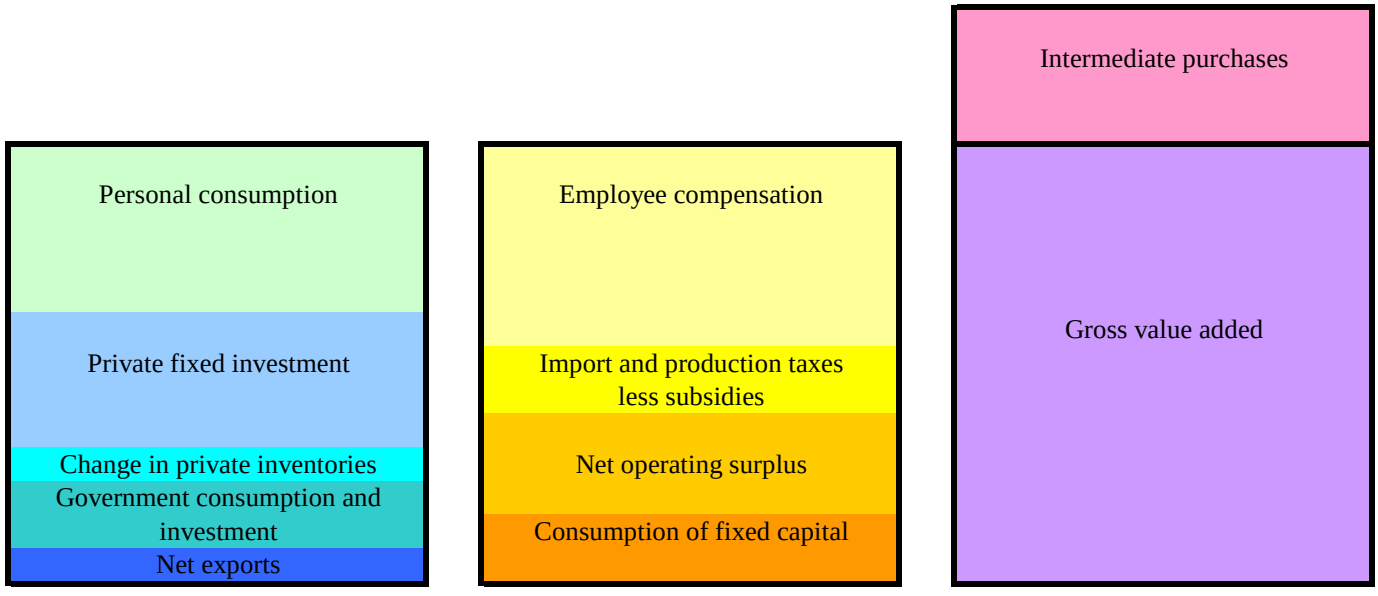
Similarly, I make no judgments about the Federal Reserve's response to the influence of firm-level accounting conservatism on macroeconomic indicators. For example, one interpretation of my results is that the Fed is unable to fully unwind the impact of accounting conservatism on GDP (i.e. the Fed is functionally fixated). Under this interpretation, firm-level accounting conservatism may impose a negative information externality on the Fed by introducing apparent weakness into measurements of macroeconomic fundamentals. Hence, the Fed may sub-optimize by setting interest rates below the socially desirable level. However, the Fed's response may be rational and optimal given the cost and difficulty of unwinding the impact of accounting conservatism in practice. For example, academic researchers form proxies for constructs like recessions and conservatism ex-post with the benefit of historical data while the Fed must make policy decisions under uncertainty in real time with incomplete data.

Alternatively, the Fed may find it optimal not to adjust for the impact of firm-level accounting conservatism. For example, prior research at the firm level asserts that conservatism provides bondholders with advance notice of deterioration in firm performance, which allows bondholders to take control of the firm earlier in order to prevent further destruction of firm value by the manager (Watts 2003a). In a similar fashion, accounting conservatism at the aggregate level may provide the Fed with advance warning of deterioration in macroeconomic activity. Thus, accounting

conservatism may play an informational role at the aggregate level, and the costs and benefits of conservatism at the aggregate level may depend on the relative importance of the downside (i.e. recession) risk and upside (i.e. inflation) risk facing the central banker.

Future research may investigate the welfare implications of my results. For example, does conditional conservatism at the aggregate level lead to greater macroeconomic growth or inflation? One example of current research that investigates related questions is Li and Shroff (2010) who investigate whether financial reporting quality leads to faster macroeconomic growth in an international setting. Similarly, Bushman et al. (2010) investigate the relation between capital allocation decisions and the timely recognition of economic losses across countries. See also Leuz and Wysocki (2008) for suggestions regarding future research on the macro effects of firms' reporting and disclosure behavior.

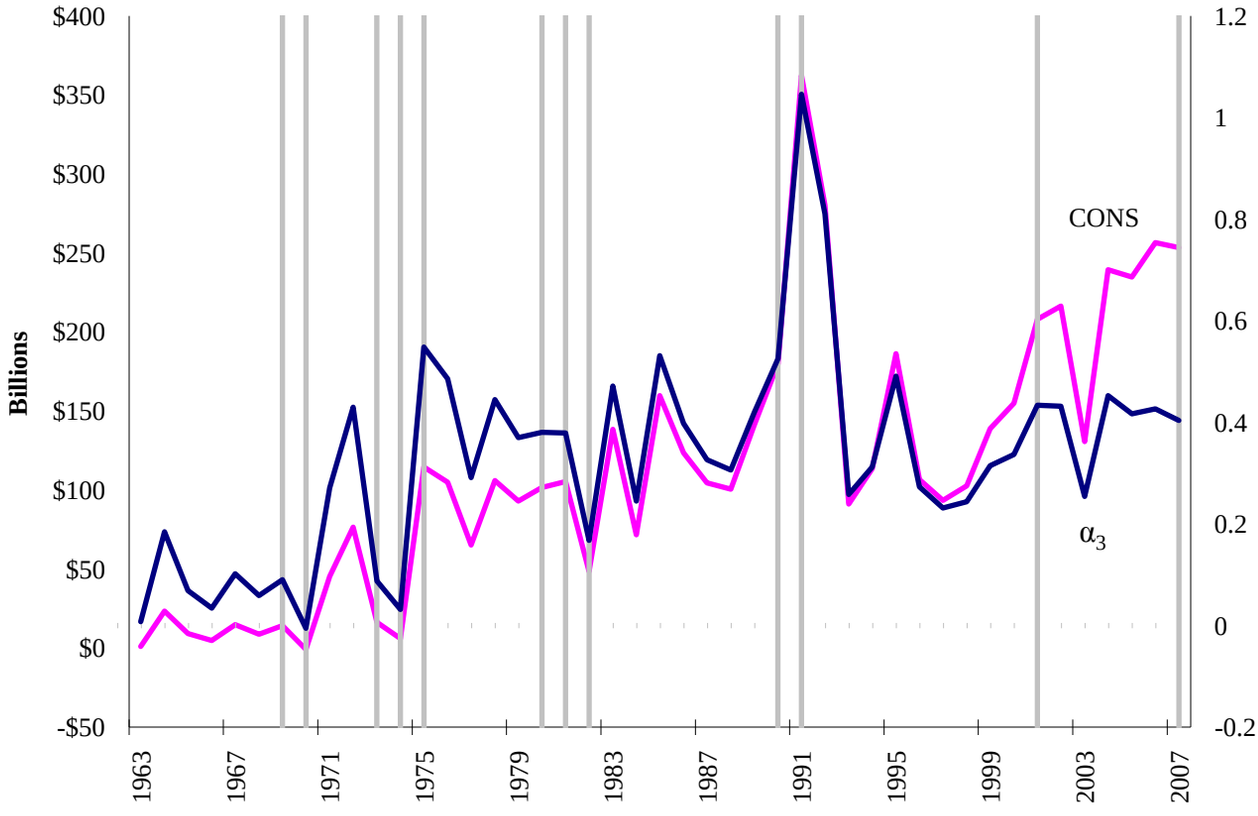
Figure 1: Alternative Methodologies to Measure Gross Domestic Product



This figure illustrates alternative ways the Bureau of Economic Analysis (BEA) measures gross domestic product (GDP). This figure appears in the BEA publication "*Concepts and Methods of the U.S. National Income and Product Accounts*", available at www.bea.gov. Gross domestic product represents the market value of the final goods and services produced in the United States (BEA 2008).

The BEA measures GDP in three ways. First, the BEA uses an "expenditures approach" to arrive directly at a GDP estimate. Second, the BEA measures the income derived from the sale of final goods and services. This "income approach" utilizes aggregate corporate profits as an input to net operating surplus and yields an estimate of gross domestic income (GDI). Third, the "production approach" subtracts the value of intermediate goods from gross output to arrive at an estimate of gross value added (GVA). The three measurement approaches are theoretically equivalent, but estimates of GDP, GDI, and GVA may vary slightly due to differences in estimation techniques and underlying source data (BEA 2007a, 2008).

Figure 2: The Impact of Firm-Level Accounting Conservatism on Measurements of Macroeconomic Fundamentals



This figure plots measurements of accounting conservatism within the cross-section of firm-level earnings and estimates of the dollar value impact of firm-level accounting conservatism on measurements of macroeconomic fundamentals. α_3 is the year *t* Basu (1997) asymmetric timeliness coefficient obtained from annual cross-sectional estimations of regression Model (10).

$CONS_t$ is an estimate of the dollar value impact of firm-level accounting conservatism on aggregate corporate profits and gross domestic product (GDP) in year *t*. $CONS_t$ is the difference between an estimate of aggregate corporate profits in year *t* if firm-level earnings were not conditionally conservative (CP_t^*) and observed aggregate corporate profits in year *t* (CP_t) from Line 17 of Bureau of Economic Analysis (BEA) National Income and Product Account (NIPA) Table 1.7.5. CP_t^* is the fitted value from Model (11) where the $FirmCons_t$ variable is restricted to zero, multiplied by aggregate fixed assets owned by public and private businesses in year *t*-1 from Line 3 of BEA Fixed Asset Table 1.1. Values for $CONS_t$ are converted from nominal year *t* dollars into real year 2000 dollars using the implicit GDP deflator from Line 1 of BEA NIPA Table 1.1.9. Larger positive values denote a greater dollar value impact of accounting conservatism on GDP (e.g. a $CONS_t$ value of 100 indicates real GDP in year *t* would have been approximately $100 Billion higher in the absence of accounting conservatism).

The sample period begins in 1963, the first year in which all necessary data are available, and ends in 2007. Vertical shaded bars denote years in which a recession occured as defined by the National Bureau of Economic Research.

Table 1

Panel A: Descriptive Statistics for Vector Autoregression Variables

Variable	N	Mean	Standard Deviation	Q1	Median	Q3
XRET	990	0.006	0.054	-0.022	0.009	0.036
DEF	990	0.011	0.007	0.007	0.009	0.013
PE	990	2.697	0.388	2.407	2.755	2.929
VALUE	990	1.632	0.362	1.400	1.506	1.719

Panel B: Vector Autoregression Parameter Estimates

	Constant	$XRET_{t-1}$	DEF_{t-1}	PE_{t-1}	$VALUE_{t-1}$	N	R^2	F
$XRET_t$	0.040 ***	0.122 ***	0.528 *	-0.012 ***	-0.005	989	0.03	6.61 ***
	(2.93)	(3.88)	(1.68)	(-2.65)	(-0.81)			
DEF_t	0.000	-0.012 ***	0.970 ***	0.000	0.000 *	989	0.96	5,892.35 ***
	(0.29)	(-14.24)	(116.59)	(-0.45)	(1.76)			
PE_t	0.024	0.032	1.896 ***	1.000 ***	-0.026 ***	989	0.98	9,704.71 ***
	(1.55)	(0.91)	(5.32)	(191.95)	(-3.74)			
$VALUE_t$	0.004	0.011	0.600 **	0.007	0.982 ***	989	0.98	12,530.17 ***
	(0.29)	(0.38)	(2.04)	(1.61)	(170.87)			

This table presents descriptive statistics and parameter estimates for the first-order vector autoregression (VAR) system used to construct proxies for aggregate corporate sector news. Panel A presents descriptive statistics for the monthly variables. The sample period begins in July 1926 and ends in December 2008.

Panel B presents parameter estimates for the VAR system of the form $z_t = a + \Gamma z_{t-1} + u_t$ where z_t is an m x1 vector of macroeconomic state variables observable to the market by the end of period t, a is an m x1 vector of constant parameters, Γ is the m xm VAR companion matrix, and u_t is an m x1 vector of independent and identically distributed residuals. Each set of two rows corresponds to a single dependent variable within the VAR system. The first row of each set presents parameter estimates, and the second row presents t-statistics in parentheses. The columns present coefficient estimates for the independent variables as well as the number of observations, the R^2, and the F-statistic. ***, **, and * represent two-tailed significance at the 1%, 5%, and 10% levels, respectively.

The variables included in the VAR system are as follows. *XRET* denotes the excess of the monthly return on the Center for Research in Securities Prices value weighted index over the risk-free rate. *DEF* represents the default spread and is defined as the difference between the yield on a portfolio of seasoned BAA corporate bonds and the yield on seasoned AAA corporate bonds as measured by Moody's. *PE* signifies the log of the 12-month trailing price-to-earnings ratio on the S&P 500 index. *VALUE* denotes the small stock value spread defined as the difference between the logs of the book-to-market ratios of small high book-to-market stocks and small low book-to-market stocks.

Table 2

Descriptive Statistics for Aggregate-Level Data

Variable	N	Mean	Standard Deviation	Q1	Median	Q3	2007 Value	Augmented Dickey-Fuller
CP	79	278.82	389.53	29.10	93.20	426.60	1,642.40	2.17
GDP	79	3,003.63	3,810.45	267.30	910.00	5,103.80	13,807.50	4.71
FATotal	79	8,137.11	10,442.46	729.80	2,197.00	13,803.50	41,175.20	3.54
FAPrivate	79	6,325.81	8,237.89	515.40	1,608.50	10,710.80	32,429.30	3.66
CP / FAPrivate	79	0.05	0.02	0.04	0.05	0.05	0.05	-3.38 **
GDP / FATotal	79	0.37	0.04	0.35	0.37	0.39	0.34	-4.04 ***
CFNews	79	0.00	0.17	-0.10	0.03	0.10	-0.05	-7.01 ***
CFNeg	79	0.46	0.50	0.00	0.00	1.00	1.00	-6.24 ***

This table presents descriptive statistics for select aggregate annual time-series data used within this study. The sample period begins in 1929 and ends in 2007.

CP denotes aggregate corporate profits with inventory valuation and capital consumption adjustments in year t from Line 17 of Bureau of Economic Analysis (BEA) National Income and Product Account (NIPA) Table 1.7.5. *GDP* represents estimates of gross domestic product in year t from Line 1 of BEA NIPA Table 1.7.5. *FATotal* signifies the current-cost value of net fixed assets owned by public and private businesses, non-profit institutions, and governments in year t-1 from Line 2 of BEA Fixed Asset Table 1.1. *FAPrivate* is the current-cost value of net fixed assets owned by public and private businesses in year t-1 from Line 3 of BEA Fixed Asset Table 1.1.

CFNews is the sum of monthly cash flow shocks in year t formed from the first-order vector autoregression system presented in Table 1. *CFNeg* is a dummy variable that equals 1 if *CFNews* < 0, and *CFNeg* equals 0 otherwise.

The augmented Dickey-Fuller τ statistic tests the null hypothesis of a unit root against the alternative hypothesis that the data series is stationary. ***, **, and * represent two-tailed significance at the 1%, 5%, and 10% levels, respectively.

Table 3

Sensitivity of Aggregate Corporate Profits and GDP to Aggregate Cash Flow News

Models (6) and (7):
Dependent Variable = $\theta_0 + \theta_1 CFNews_t + \theta_2 CFNeg_t + \theta_3 CFNews_t * CFNeg_t + \mu_t$

Model (6)				Model (7)			
Dependent variable:	CP_t / $FAPrivate_{t-1}$			Dependent variable:	GDP_t / $FATotal_{t-1}$		
N	79			N	79		
Adjusted R^2	0.09			Adjusted R^2	0.06		
Variable	Coefficient	*t*-Statistic		Variable	Coefficient	*t*-Statistic	
Intercept	0.052	(10.98)	***	Intercept	0.387	(33.71)	***
CFNews	-0.047	(-1.50)		CFNews	-0.115	(-1.47)	
CFNeg	0.000	(-0.05)		CFNeg	-0.009	(-0.65)	
CFNews*CFNeg	0.100	(2.94)	***	CFNews*CFNeg	0.211	(2.26)	**

This table reports the results from separate time-series regressions of scaled aggregate corporate profits and gross domestic product on proxies for aggregate cash flow news.

CP_t denotes aggregate corporate profits with inventory valuation and capital consumption adjustments in year t from Line 17 of Bureau of Economic Analysis (BEA) National Income and Product Account (NIPA) Table 1.7.5. GDP_t represents gross domestic product in year t from Line 1 of BEA NIPA Table 1.7.5. $FAPrivate_{t-1}$ is the current-cost value of net fixed assets owned by public and private businesses in year t-1 from Line 3 of BEA Fixed Asset Table 1.1. $FATotal_{t-1}$ is the current-cost value of net fixed assets owned by public and private businesses, non-profit institutions, and governments in year t-1 from Line 2 of BEA Fixed Asset Table 1.1. $CFNews_t$ is the sum of monthly cash flow shocks in year t formed from the first-order vector autoregression system presented in Table 1. $CFNeg_t$ is a dummy variable that equals 1 if $CFNews_t < 0$, and $CFNeg_t$ equals 0 otherwise.

The sample period begins in 1929 and ends in 2007. t-statistics are based on Newey-West (1987) standard errors to control for potential autocorrelation in the residuals. ***, **, and * represent two-tailed significance at the 1%, 5%, and 10% levels, respectively.

Table 4

Sensitivity of Aggregate Compustat Earnings to Aggregate Cash Flow News

Dependent Variable = $\theta_0 + \theta_1 CFNews_t + \theta_2 CFNeg_t + \theta_3 CFNews_t * CFNeg_t + \mu_t$

Panel A				Panel B			
Dependent variable:	$EARN_t / FAPrivate_{t-1}$			Dependent variable:	$CP_t / FAPrivate_{t-1}$		
Sample period:	1962 - 2007			Sample period:	1962 - 2007		
N	46			N	46		
Adjusted R^2	0.10			Adjusted R^2	-0.01		
Variable	Coefficient	*t*-Statistic		Variable	Coefficient	*t*-Statistic	
Intercept	0.011	(4.82)	***	Intercept	0.046	(12.19)	***
CFNews	0.025	(3.91)	***	CFNews	0.012	(0.54)	
CFNeg	0.001	(1.11)		CFNeg	-0.002	(-0.47)	
CFNews*CFNeg	-0.018	(-1.35)		CFNews*CFNeg	-0.005	(-0.18)	

This table reports the results from separate time-series regressions of scaled aggregate Compustat earnings and aggregate BEA corporate profits on proxies for aggregate cash flow news.

CP_t denotes aggregate corporate profits with inventory valuation and capital consumption adjustments in year t from Line 17 of Bureau of Economic Analysis (BEA) National Income and Product Account (NIPA) Table 1.7.5. $EARN_t$ represents the sum of Compustat earnings (data item *ib*) for all firms in year t. $FAPrivate_{t-1}$ is the current-cost value of net fixed assets owned by public and private businesses in year t-1 from Line 3 of BEA Fixed Asset Table 1.1. $CFNews_t$ is the sum of monthly cash flow shocks in year t formed from the first-order vector autoregression system presented in Table 1. $CFNeg_t$ is a dummy variable that equals 1 if $CFNews_t < 0$, and $CFNeg_t$ equals 0 otherwise.

t-statistics are based on Newey-West (1987) standard errors to control for potential autocorrelation in the residuals. ***, **, and * represent two-tailed significance at the 1%, 5%, and 10% levels, respectively.

Table 5

Sensitivity of Aggregate IRS Taxable Income to Aggregate Cash Flow News

$$IRS_t / FAPrivate_{t-1} = \theta_0 + \theta_1 CFNews_t + \theta_2 CFNeg_t + \theta_3 CFNews_t * CFNeg_t + \mu_t$$

N	46
Adjusted R^2	-0.06

Variable	Coefficient	*t*-Statistic	
Intercept	0.039	(12.27)	***
CFNews	-0.004	(-0.19)	
CFNeg	0.000	(-0.03)	
CFNews*CFNeg	-0.003	(-0.10)	

This table reports the results of a time-series regression of scaled aggregate IRS taxable income on proxies for aggregate cash flow news.

IRS_t represents aggregate taxable income in year t from Column 3 of Internal Revenue Service (IRS) Statistics of Income (SOI) Table 15. $FAPrivate_{t-1}$ is the current-cost value of net fixed assets owned by public and private businesses in year t-1 from Line 3 of Bureau of Economic Analysis (BEA) Fixed Asset Table 1.1. $CFNews_t$ is the sum of monthly cash flow shocks in year t formed from the first-order vector autoregression system presented in Table 1. $CFNeg_t$ is a dummy variable that equals 1 if $CFNews_t < 0$, and $CFNeg_t$ equals 0 otherwise.

The sample period for begins in 1960 and ends in 2005. t-statistics are based on Newey-West (1987) standard errors to control for potential autocorrelation in the residuals. ***, **, and * represent two-tailed significance at the 1%, 5%, and 10% levels, respectively.

Table 6

Estimating the Impact of Firm-Level Conservatism on Aggregate Corporate Profits

Model (11):

$CP_t / FAPrivate_{t-1} = \Phi_0 + \Phi_1 NewsSens_t + \Phi_2 LossRecog_t + \Phi_3 FirmCons_t + \Phi_4 NBER_t + \nu_t$

N		45	
Adjusted R^2		0.29	
Variable	Coefficient	*t*-Statistic	
Intercept	0.055	(13.56)	***
NewsSens	-0.018	(-0.79)	
LossRecog	0.075	(1.29)	
FirmCons	-0.023	(-2.58)	**
NBER	-0.008	(-2.30)	**

This table reports the results of a time-series regression designed to estimate the impact of firm-level accounting conservatism on scaled aggregate corporate profits.

CP_t denotes aggregate corporate profits with inventory valuation and capital consumption adjustments in year t from Line 17 of Bureau of Economic Analysis (BEA) National Income and Product Account (NIPA) Table 1.7.5, and $FAPrivate_{t-1}$ is the current-cost value of net fixed assets owned by public and private businesses in year t-1 from Line 3 of BEA Fixed Asset Table 1.1.

$NewsSens_t$, $LossRecog_t$, and $FirmCons_t$ are the year t α_1, α_2, and α_3 coefficients obtained from annual cross-sectional estimations of the Basu (1997) asymmetric timeliness regression as defined by Model (10), respectively. $NBER_t$ is a dummy variable that equals 1 if a recession as defined by the National Bureau of Economic Research occurred at any time during year t, and $NBER_t$ equals 0 otherwise.

The sample period begins in 1963, the first year in which all necessary data are available, and ends in 2007. t-statistics are based on Newey-West (1987) standard errors to control for potential autocorrelation in the residuals. ***, **, and * represent two-tailed significance at the 1%, 5%, and 10% levels, respectively.

Table 7

The Relation Between the Business Cycle and Firm-Level Accounting Conservatism

$X_{i,t} / MVE_{i,t-1} = \alpha_0 + \alpha_1 R_{i,t} + \alpha_2 Neg_{i,t} + \alpha_3 PreNBER_t + \alpha_4 NBER_t + \alpha_5 PostNBER_t + \alpha_6 R_{i,t}*Neg_{i,t} + \alpha_7 R_{i,t}*Neg_{i,t}*PreNBER_t + \alpha_8 R_{i,t}*Neg_{i,t}*NBER_t + \alpha_9 R_{i,t}*Neg_{i,t}*PostNBER_t + \mu_t$

N		71,799	
Adjusted R^2		0.03	
Variable	Coefficient	*t*-Statistic	
Intercept	0.052	(7.80)	***
R	-0.010	(-1.14)	
Neg	0.002	(0.25)	
PreNBER	0.032	(1.79)	*
NBER	0.001	(0.02)	
PostNBER	0.027	(1.51)	
R*Neg	0.389	(13.22)	***
R*Neg*PreNBER	0.086	(2.61)	***
R*Neg*NBER	0.092	(2.08)	**
R*Neg*PostNBER	-0.093	(-2.05)	**

This table reports the results from a cross-sectional regression of scaled firm-level earnings on proxies for firm-level news and the business cycle.

$X_{i,t}$ denotes firm *i*'s income before extraordinary items (Compustat item *ib*) in fiscal year *t*, $MVE_{i,t-1}$ denotes firm *i*'s market value of equity defined as common shares outstanding (Compustat item *csho*) multiplied by stock price (Compustat item *prcc_f*) each as of the end of fiscal year *t*-1, $R_{i,t}$ is firm *i*'s buy-and-hold return in year *t*, $Neg_{i,t}$ is a dummy variable equal to 1 if $R_{i,t} < 0$, and $Neg_{i,t}$ equals 0 otherwise.

$PreNBER_t$ is a dummy variable that equals 1 if a recession as defined by the National Bureau of Economic Research occurred at any time during year *t*-1, and $PreNBER_t$ equals 0 otherwise. $NBER_t$ is a dummy variable that equals 1 if a recession as defined by the National Bureau of Economic Research occurred at any time during year *t*, and $NBER_t$ equals 0 otherwise. $PostNBER_t$ is a dummy variable that equals 1 if a recession as defined by the National Bureau of Economic Research occurred at any time during year *t*+1, and $PostNBER_t$ equals 0 otherwise.

The sample period begins in 1963 and ends in 2007. t-statistics are based on standard errors that have been clustered by both firm and year. ***, **, and * represent two-tailed significance at the 1%, 5%, and 10% levels, respectively.

Table 8

Univariate Correlations

	CONS	EQUITY	INDPRO	HOUSING	CONSUMER	UNEMPLOY	NBER
CONS	1.00	0.15	-0.31 **	-0.04	-0.02	0.15	0.02
EQUITY	0.15	1.00	0.09	-0.07	0.04	0.26 **	-0.18
INDPRO	-0.39 ***	-0.02	1.00	0.37 ***	0.54 ***	-0.39 ***	-0.50 ***
HOUSING	0.05	-0.07	0.34 **	1.00	0.22	-0.13	-0.47 ***
CONSUMER	-0.05	0.02	0.51 ***	0.19	1.00	-0.46 ***	-0.55 ***
UNEMPLOY	0.18	0.26 **	-0.37 ***	-0.07	-0.46 ***	1.00	0.09
NBER	-0.04	-0.16	-0.51 ***	-0.52 ***	-0.54 ***	0.06	1.00

This table presents univariate correlations between select aggregate annual time-series variables.

CONS is an estimate of the dollar value impact of firm-level accounting conservatism on measurements of aggregate corporate profits and GDP in year *t* defined by Equation (12) and described in Figure 2. Values for *CONS* are converted from nominal year *t* dollars into real year 2000 dollars using the implicit GDP deflator from Line 1 of Bureau of Economic Analysis (BEA) National Income and Product Account (NIPA) Table 1.1.9. Larger positive values denote a greater dollar value impact of accounting conservatism on GDP (e.g. a *CONS* value of 100 indicates real GDP would have been approximately $100 Billion higher in the absence of accounting conservatism).

EQUITY is the return on the Center for Research in Securities Prices value weighted index in year *t*. *INDPRO* is the percentage change from year *t*-1 to year *t* in the Industrial Production and Capacity Utilization index as measured by the Federal Reserve. *HOUSING* is the number of new residential housing starts in year *t* as measured by the U.S. Census Bureau. *CONSUMER* is the average of the monthly University of Michigan Consumer Sentiment index over year *t*.

UNEMPLOY is the unemployment rate of the civilian non-institutional population in year *t* as measured by the U.S. Bureau of Labor Statistics. *NBER* is a dummy variable that equals 1 if a recession as defined by the National Bureau of Economic Research occurred at any time during year *t*, and *NBER* equals 0 otherwise.

Pearson correlations are presented above the diagonal, and Spearman rank correlations are presented below the diagonal. ***, **, and * represent two-tailed significance at the 1%, 5%, and 10% levels, respectively.

Table 9

Descriptive Statistics for Monetary Policy Reaction Function Variables

Variable	N	Mean	Standard Deviation	Q1	Median	Q3	2007 Value	Augmented Dickey-Fuller	
FEDFUNDS	53	5.735	3.214	3.310	5.110	7.570	5.020	-2.85	*
GAP1	59	1.544	123.861	-63.606	12.293	62.608	96.557	-4.15	***
GAP2	45	-109.518	139.547	-169.634	-124.054	-19.344	-156.774	-3.33	**
INF	78	3.066	3.713	1.547	2.837	5.001	2.864	-5.75	***
CONS	45	114.412	85.295	48.524	104.965	154.849	253.331	-2.00	
VOLCKER	79	0.101	0.304	0.000	0.000	0.000	0.000	-2.45	
POSTVOLCKER	79	0.253	0.438	0.000	0.000	1.000	1.000	-0.55	

This table reports descriptive statistics for variables within the monetary policy reaction functions designed to estimate accounting conservatism's impact on the federal funds rate. $FEDFUNDS_t$ is the weighted average of the nominal federal funds rate in year t obtained from the U.S. Federal Reserve's Statistical Release H.15. $GAP1_t$ is a measure of the output gap in year t defined as $GDPPotential_t$ - GDP_t where $GDPPotential_t$ is an estimate of potential GDP in year t measured in real year 2000 dollars from the Congressional Budget Office. GDP_t is an estimate of GDP for year t from Line 1 of Bureau of Economic Analysis (BEA) National Income and Product Account (NIPA) Table 1.7.5 which has been converted from nominal year t dollars into real year 2000 dollars using the implicit GDP deflator from Line 1 of BEA NIPA Table 1.1.9.

$GAP2_t$ is a measure of the output gap in year t adjusted for the impact of accounting conservatism defined as $GDPPotential_t$ - (GDP_t + $CONS_t$). $CONS_t$ is an estimate of the dollar value impact of firm-level accounting conservatism on measurements of aggregate corporate profits and GDP in year t defined by Equation (12) and described in Figure 2. Values for *CONS* are converted from nominal year t dollars into real year 2000 dollars using the implicit GDP deflator from Line 1 of BEA NIPA Table 1.1.9. Larger positive values denote a greater dollar value impact of accounting conservatism on GDP (e.g. a *CONS* value of 100 indicates real GDP would have been approximately $100 Billion higher in the absence of accounting conservatism).

INF_t is a measure of inflation calculated as the percentage change in the implicit GDP deflator from Line 1 of BEA NIPA Table 1.1.9 from year t-1 to year t. $VOLCKER_t$ ($POSTVOLCKER_t$) is a dummy variable that equals 1 if Paul Volcker (Alan Greenspan or Ben Bernanke) was the Chairman of the Federal Reserve in year t, and $VOLCKER_t$ ($POSTVOLCKER_t$) equals 0 otherwise.

The augmented Dickey-Fuller τ statistic tests the null hypothesis of a unit root against the alternative hypothesis that the data series is stationary. ***, **, and * represent two-tailed significance at the 1%, 5%, and 10% levels, respectively.

Table 10

Monetary Policy Reaction Functions (Levels Analysis)

Model (13a): $FEDFUNDS_t = \beta_0 + \beta_1 GAP1_t + \beta_2 INF_t + \beta_3 VOLCKER_t + \beta_4 POSTVOLCKER_t + \varepsilon_t$

Model (13b): $FEDFUNDS_t = \Psi_0 + \Psi_1 GAP2_t + \Psi_2 INF_t + \Psi_3 CONS_t + \Psi_4 VOLCKER_t + \Psi_5 POSTVOLCKER_t + \eta_t$

	Model (13a)	Model (13b)
N	53	45
Adjusted R^2	0.78	0.78
Intercept	0.773	1.011
	(1.53)	(1.52)
GAP1	-0.007 ***	
	(-5.11)	
GAP2		-0.006 ***
		(-4.48)
INF	1.003 ***	1.057 ***
	(9.58)	(9.87)
CONS		-0.015 ***
		(-3.58)
VOLCKER	5.357 ***	5.654 ***
	(11.94)	(10.66)
POSTVOLCKER	1.454 **	2.704 ***
	(2.10)	(3.55)

This table reports the results from monetary policy reaction functions designed to estimate accounting conservatism's impact on the federal funds rate. $FEDFUNDS_t$ is the weighted average of the nominal federal funds rate in year t obtained from the U.S. Federal Reserve's Statistical Release H.15. $GAP1_t$ is a measure of the output gap in year t defined as $GDPPotential_t$ - GDP_t where $GDPPotential_t$ is an estimate of potential GDP in year t measured in real year 2000 dollars from the Congressional Budget Office. GDP_t is an estimate of GDP for year t from Line 1 of Bureau of Economic Analysis (BEA) National Income and Product Account (NIPA) Table 1.7.5 which has been converted from nominal year t dollars into real year 2000 dollars using the implicit GDP deflator from Line 1 of BEA NIPA Table 1.1.9.

$GAP2_t$ is a measure of the output gap in year t adjusted for the impact of accounting conservatism defined as $GDPPotential_t$ - (GDP_t + $CONS_t$). $CONS_t$ is an estimate of the dollar value impact of firm-level accounting conservatism on measurements of aggregate corporate profits and GDP in year t defined by Equation (12) and described in Figure 2. Values for *CONS* are converted from nominal year t dollars into real year 2000 dollars using the implicit GDP deflator from Line 1 of BEA NIPA Table 1.1.9. Larger positive values denote a greater dollar value impact of accounting conservatism on GDP (e.g. a *CONS* value of 100 indicates real GDP would have been approximately $100 Billion higher in the absence of accounting conservatism).

INF_t is a measure of inflation calculated as the percentage change in the implicit GDP deflator from Line 1 of BEA NIPA Table 1.1.9 from year t-1 to year t. $VOLCKER_t$ ($POSTVOLCKER_t$) is a dummy variable that equals 1 if Paul Volcker (Alan Greenspan or Ben Bernanke) was the Chairman of the Federal Reserve in year t, and $VOLCKER_t$ ($POSTVOLCKER_t$) equals 0 otherwise.

The sample period for Model (13a) begins in 1955 and ends in 2007. Estimating $CONS_t$ requires Compustat data, and therefore the sample period for Model (13b) begins in 1963 and ends in 2007. t-statistics are based on Newey-West (1987) standard errors to control for potential autocorrelation in the residuals. ***, **, and * represent two-tailed significance at the 1%, 5%, and 10% levels, respectively.

Table 11

Monetary Policy Reaction Functions (Changes Analysis)

Panel A: $\Delta FEDFUNDS_t = \beta_0 + \beta_1 \Delta GAP1_t + \beta_2 \Delta INF_t + \beta_3 \Delta VOLCKER_t + \beta_4 \Delta POSTVOLCKER_t + \varepsilon_t$

Panel B: $\Delta FEDFUNDS_t = \Psi_0 + \Psi_1 \Delta GAP2_t + \Psi_2 \Delta INF_t + \Psi_3 \Delta CONS_t + \Psi_4 \Delta VOLCKER_t + \Psi_5 \Delta POSTVOLCKER_t + \eta_t$

	Panel A	Panel B
N	52	44
Adjusted R^2	0.51	0.51
Intercept	0.021	-0.015
	(0.11)	(-0.07)
ΔGAP1	-0.009 ***	
	(-5.08)	
ΔGAP2		-0.008 ***
		(-5.10)
ΔINF	0.916 ***	0.975 ***
	(5.08)	(4.90)
ΔCONS		-0.012 ***
		(-2.97)
ΔVOLCKER	2.713 ***	2.620 ***
	(7.64)	(7.17)
ΔPOSTVOLCKER	-0.124	-0.088
	(-0.56)	(-0.36)

This table reports the results from monetary policy reaction functions designed to estimate accounting conservatism's impact on the federal funds rate. $\Delta FEDFUNDS_t = FEDFUNDS_t - FEDFUNDS_{t-1}$ where $FEDFUNDS_t$ is the weighted average of the nominal federal funds rate in year t obtained from the U.S. Federal Reserve's Statistical Release H.15. $\Delta GAP1_t = GAP1_t - GAP1_{t-1}$ where $GAP1_t$ is a measure of the output gap in year t defined as $GDPPotential_t - GDP_t$. $GDPPotential_t$ is an estimate of potential GDP in year t measured in real year 2000 dollars from the Congressional Budget Office. GDP_t is an estimate of GDP for year t from Line 1 of Bureau of Economic Analysis (BEA) National Income and Product Account (NIPA) Table 1.7.5 which has been converted from nominal year t dollars into real year 2000 dollars using the implicit GDP deflator from Line 1 of BEA NIPA Table 1.1.9.

$\Delta GAP2_t = GAP2_t - GAP2_{t-1}$ where $GAP2_t$ is a measure of the output gap in year t adjusted for the impact of accounting conservatism. $GAP2_t$ is defined as $GDPPotential_t - (GDP_t + CONS_t)$. $CONS_t$ is an estimate of the dollar value impact of firm-level accounting conservatism on measurements of aggregate corporate profits and GDP in year t defined by Equation (12) and described in Figure 2. Values for $CONS$ are converted from nominal year t dollars into real year 2000 dollars using the implicit GDP deflator from Line 1 of BEA NIPA Table 1.1.9. Larger positive values denote a greater dollar value impact of accounting conservatism on GDP (e.g. a $CONS$ value of 100 indicates real GDP would have been approximately $100 Billion higher in the absence of accounting conservatism). $\Delta CONS_t = CONS_t - CONS_{t-1}$.

$\Delta INF_t = INF_t - INF_{t-1}$. INF_t is a measure of inflation calculated as the percentage change in the implicit GDP deflator from Line 1 of BEA NIPA Table 1.1.9 from year t-1 to year t. $\Delta VOLCKER_t$ ($\Delta POSTVOLCKER_t$) is a dummy variable that equals 1 if Paul Volcker (Alan Greenspan) became Chairman of the Federal Reserve in year t, and $\Delta VOLCKER_t$ ($\Delta POSTVOLCKER_t$) equals 0 otherwise.

The sample period for Panel A begins in 1956 and ends in 2007. Estimating $\Delta CONS_t$ requires Compustat data, and therefore the sample period for Panel B begins in 1964 and ends in 2007. ***, **, and * represent two-tailed significance at the 1%, 5%, and 10% levels, respectively.

Appendix A

Differences Between Financial, Tax, and National Income and Product Accounting

	Line Item	Financial Accounting	Tax Accounting	National Income and Product Accounts
1	Depreciation Expense	Book value depreciated (generally) using straight-line method	Modified Accelerated Cost Recovery System	Current replacement cost depreciated using straight-line method
2	Cost of Goods Sold	First In First Out (FIFO), Last In First Out (LIFO), or weighted average	Same as financial accounting	Current replacement cost valuation
3	Stock Option Expense	Expense recognized at grant date based on fair value of options	Expense recognized upon option exercise	Same as tax accounting
4	Impairment of Long-Lived Assets	Loss recognized when undiscounted cash flows exceed asset carrying value	Expenses are recognized when incurred	Same as tax accounting
5	Investment Tax Credit	Credit is recognized over the life of the acquired asset	Credit is fully recognized upon asset acquisition	Same as tax accounting
6	Payments from Related Foreign Companies	No income or expense on a consolidated basis	Receipts are considered constructive taxable income	Same as financial accounting
7	Mineral Exploration Expenditures	Expenditures are capitalized and depreciated over the life of the asset	Expenditures are expensed when incurred	Same as financial accounting
8	Depletion	Depletion is cost based (i.e. per unit expense calculated by dividing the cost of the natural resource by the estimated units in the deposit)	Depletion is either cost based or a percentage of the gross income from the deposit	No depletion expense recognized
9	Bonus Payments for Drilling Rights	Payments are included in asset depletion base. Payments are immediately expensed if drilling is abandoned.	Same as financial accounting	No bonus payment expense recognized
10	Bad Debt Expense	Expense recognized upon change in estimate of uncollectible accounts	Expense recognized when debts are written off	No bad debt expense recognized

This Appendix outlines differences in the accounting treatment of select income statement line items between Generally Accepted Accounting Principles (GAAP) for financial accounting, the Internal Revenue Code (IRC) for tax accounting, and the National Income and Product Accounts (NIPA) used by the Bureau of Economic Analysis (BEA) when constructing aggregate corporate profits. For a more complete discussion of differences between GAAP, the IRC, and NIPA, see the BEA methodology paper "*Corporate Profits: Profits Before Tax, Profits Tax Liability, and Dividends*" available on the BEA website www.bea.gov.

Appendix B

Expenditures Approach for Measuring Gross Domestic Product

[Billions of dollars]

Line	Line Item	2006 Amount	Note
1	**Gross domestic product**	**13,398.9**	Line 1 = Line 2 + Line 7 + Line 14 + Line 21
2	**Personal consumption expenditures**	**9,322.7**	
3	Goods	3,221.7	
4	Durable goods	1,133.0	
5	Nondurable goods	2,088.7	
6	Services	6,100.9	
7	**Gross private domestic investment**	**2,327.2**	
8	Fixed investment	2,267.2	
9	Nonresidential	1,505.3	
10	Structures	433.7	
11	Equipment and software	1,071.7	
12	Residential	761.9	
13	Change in private inventories	60.0	
14	**Net exports of goods and services**	**(769.3)**	
15	Exports	1,471.0	
16	Goods	1,024.4	
17	Services	446.6	
18	Imports	2,240.3	
19	Goods	1,884.9	
20	Services	355.4	
21	**Undistributed corporate profits**	**2,518.4**	
22	Federal	931.7	
23	National defense	624.9	
24	Nondefense	306.8	
25	State and local	1,586.7	

This Appendix illustrates the "expenditures approach" for measuring gross domestic product (GDP). This appendix shows the 2006 values for National Income and Product Account (NIPA) Table 1.1.5 in billions of year 2006 dollars . Gross Domestic Product is theoretically equivalent to Gross Domestic Income (GDI) measured using the "income approach" illustrated in Appendix C. In practice, estimates of GDP and GDI may vary slightly due to differences in estimation techniques and underlying source data as shown by the statistical discrepancy in Appendix C.

Appendix C
Income Approach for Measuring Gross Domestic Product
[Billions of dollars]

Line	Line Item	2006 Amount	Note
1	**Gross domestic income**	**13,619.5**	Line 1 = Line 2 + Line 9 - Line 10 + Line 11+ Line 23
2	**Compensation of employees, paid**	**7,483.6**	
3	Wage and salary accruals	6,076.8	
4	Disbursements	6,075.5	
5	To persons	6,066.0	
6	To the rest of the world	9.5	
7	Wage accruals less disbursements	1.3	
8	Supplements to wages and salaries	1,406.9	
9	**Taxes on production and imports**	**986.8**	
10	**Less: Subsidies**	**51.4**	
11	**Net operating surplus**	**3,539.7**	
12	Private enterprises	3,544.0	
13	Net interest and misc. payments	830.1	
14	Business current transfer payments (net)	83.0	
15	Proprietors' income with IV and CC adjustments	1,133.0	
16	Rental income of persons with CC adjustment	146.5	
17	Corporate profits with IV and CC adjustments	1,351.5	See also NIPA Table 1.7.5 Line 17
18	Taxes on corporate income	473.3	
19	Profits after tax with IV and CC adjustments	878.2	
20	Net dividends	626.9	
21	Undistributed corporate profits	251.3	
22	Current surplus of government enterprises	(4.2)	
23	**Consumption of fixed capital**	**1,660.7**	
24	Private	1,391.4	
25	Government	269.3	
26	Statistical discrepancy	(220.6)	
	Gross domestic product	**13,398.9**	GDP = Line 1 + Line 26

This Appendix illustrates the "income approach" for measuring gross domestic product (GDP). This appendix shows the 2006 values for National Income and Product Account (NIPA) Table 1.10 in billions of year 2006 dollars . Items of interest include Corporate Profits with Inventory Valuation (IV) and Capital Consumption (CC) Adjustments in Line 17. This aggregate corporate profits measure used within the empirical tests is an input to Net Operating Surplus in Line 11 which, in turn, is an input to Gross Domestic Income (Line 1). Finally, Gross Domestic Income (GDI) is theoretically equivalent to Gross Domestic Product measured using the "expenditures approach" illustrated in Appendix B. In practice, estimates of GDP and GDI may vary slightly due to differences in estimation techniques and underlying source data as shown by the statistical discrepancy in Line 26.

References

Anilowski, C., M. Feng, and D.J. Skinner. 2007. Does Earnings Guidance Affect Market Returns? The Nature and Information Content of Aggregate Earnings Guidance. *Journal of Accounting & Economics* 44: 36-63.

Asso, P.F., G.A. Kahn, and R. Leeson. 2007. The Taylor Rule and the Transformation of Monetary Policy. Working Paper, Federal Reserve Bank of Kansas City Economic Research Department.

Ball, L., and R.R. Tchaidze. 2002. The Fed and the New Economy. *American Economic Review* 92: 108-114.

Ball, R. 2001. Infrastructure Requirements for an Economically Efficient System of Public Financial Reporting and Disclosure. *Brookings-Wharton Papers on Financial Services* 2001: 127–169.

Ball, R. 2008. What is the Actual Economic Role of Financial Reporting? *The Accounting Review* 22: 427–432.

Ball, R., S.P. Kothari, and V. Nikolaev. 2010. Econometrics of the Basu Asymmetric Timeliness Coefficient and Accounting Conservatism. Working Paper, University of Chicago.

Ball, R., S.P. Kothari, and A. Robin. 2000. The Effect of International Institutional Factors on Properties of Accounting Earnings. *Journal of Accounting & Economics* 29: 1-51.

Ball, R., G. Sadka, and R. Sadka. 2009. Aggregate Earnings and Asset Prices. *Journal of Accounting Research* 47: 1097-1133.

Ball, R., and L. Shivakumar. 2005. Earnings Quality in U.K. Private Firms: Comparative Loss Recognition Timeliness. *Journal of Accounting and Economics* 39: 83-128.

Ball, R., and L. Shivakumar. 2008. How Much New Information is There in Earnings? *Journal of Accounting Research* 46: 975-1016.

Basu, S. 1997. The Conservatism Principle and the Asymmetric Timeliness of Earnings. *Journal of Accounting & Economics* 24: 3-37.

Beaver, W.H., W. Landsman, and E. Owens. 2010. Asymmetry in Earnings Timeliness and Persistence: A Simultaneous Equations Approach. Working Paper, Stanford University.

Beaver, W.H., and S.G. Ryan. 2005. Conditional and Unconditional Conservatism: Concepts and Modeling. *Review of Accounting Studies* 10: 269-309.

Beaver, W.H., and S.G. Ryan. 2009. Risky Debt, Mixed-Attribute Accounting, and the Identification of Conditional Conservatism. Working Paper, New York University.

Board of Governors of the Federal Reserve System. 2002. *The Federal Reserve System: Purposes and Functions*. New York, NY. Books for Business.

Bureau of Economic Analysis. 2000. GDP: One of the Great Inventions of the 20th Century. *Survey of Current Business* 1: 6-9.

Bureau of Economic Analysis. 2002. *Corporate Profits: Profits Before Tax, Profits Tax Liability, and Dividends Methodology Paper*. Washington, D.C.

Bureau of Economic Analysis. 2003. *Fixed Assets and Consumer Durable Goods in the United States*. Washington, D.C.

Bureau of Economic Analysis. 2004. *Corporate Profits in the GDP Accounts*. Presentation to the National Association of Business Economics. Kissimmee, Florida.

Bureau of Economic Analysis. 2007a. *An Introduction to the National Income and Product Accounts*. Washington, D.C.

Bureau of Economic Analysis. 2007b. *Measuring the Economy: A Primer on GDP and the National Income and Product Accounts*. Washington, D.C.

Bureau of Economic Analysis. 2008. *Concepts and Methods of the U.S. National Income and Product Accounts*. Washington, D.C.

Bushman, R.M., J.D. Piotroski, and A.J. Smith. 2010. Capital Allocation and Timely Accounting Recognition of Economic Losses. Working Paper, University of Chicago.

Callen, J.L., Y. Guan, and J. Qiu. 2010. The Market for Corporate Control and Accounting Conservatism. Working Paper, University of Toronto.

Callen, J.L., D. Segal, and O. Hope. 2010. The Pricing of Conservative Accounting and the Measurement of Conservatism at the Firm-Year Level. *Review of Accounting Studies* 15: 145-178.

Campbell, J.Y. 1991. A Variance Decomposition for Stock Returns. *The Economic Journal* 101: 157-179.

Campbell, J.Y., and R.J. Shiller. 1988. The Dividend-Price Ratio and Expectations of Future Dividends and Discount Factors. *The Review of Financial Studies* 1: 195-228.

Campbell, J.Y., and T. Vuolteenaho. 2004. Bad Beta, Good Beta. *American Economic Review* 94: 1249-1275.

Caskey, J.A., and K. Peterson. 2010. On the Estimation of the Asymmetric Timeliness of Earnings: Inference and Bias Corrections. Working Paper, University of California at Los Angeles.

Cecchetti, S.G. 1998. Policy Rules and Targets: Framing the Central Banker's Problem. *Federal Reserve Bank of New York Economic Policy Review* June 1998: 1-14.

Chappell Jr., H.W., T.M. Havrilesky, and R.R. McGregor. 1993. Partisan Monetary Policies: Presidential Influence Through the Power of Appointment. *Quarterly Journal of Economics* 108: 185-218.

Chen, L., and X. Zhao. 2009. Return Decomposition. *Review of Financial Studies* 22: 5213-5249.

Cready, W.M., and U.G. Gurun. 2010. Aggregate Market Reaction to Earnings Announcements. *Journal of Accounting Research* 36: 289-334.

Davis, S.J., J. Haltiwanger, R. Jarmin, and J. Miranda. 2006. Volatility and Dispersion in Business Growth Rates: Publicly Traded versus Privately Held Firms. *Macroeconomics Annual* 21: 107-156.

Dietrich, J.R., K.A. Muller III, and E.J. Riedl. 2007. Asymmetric Timeliness Tests of Accounting Conservatism. *Review of Accounting Studies* 12: 95-124.

Fama, E.F., and K.R. French. 1989. Business Conditions and Expected Returns on Stocks and Bonds. *Journal of Financial Economics* 25: 23-49.

Fama, E.F., and K.R. French. 1993. Common Risk Factors in the Returns on Stocks and Bonds. *Journal of Financial Economics* 33: 3-56.

Fama, E.F., and J. MacBeth. 1973. Risk, Return, and Equilibrium: Empirical Tests. *Journal of Political Economy* 71: 607-636.

Financial Accounting Standards Board. 2010. Conceptual Framework for Financial Reporting. *Statement of Financial Accounting Concepts No. 8*.

Gigler, F., and T. Hemmer. 1998. On the Frequency, Quality, and Informational Role of Mandatory Financial Reports. *Journal of Accounting Research* 36: 117-147.

Gigler, F., C. Kanodia, H. Sapra, and R. Venugopalan. 2009. Accounting Conservatism and the Efficiency of Debt Contracts. *Journal of Accounting Research* 47: 767-797.

Givoly, D., and C. Hayn. 2000. The Changing Time-Series Properties of Earnings, Cash Flows and Accruals: Has Financial Reporting Become More Conservative? *Journal of Accounting & Economics* 29: 287-320.

Givoly, D., C.K. Hayn, and A. Natarajan. 2007. Measuring Reporting Conservatism. *The Accounting Review* 82: 65-106.

Himmelberg, C.P., J.M. Mahoney, A. Bang, and B Chernoff. 2004. Recent Revisions to Corporate Profits: What We Know and When We Knew It. *Federal Reserve Bank of New York Current Issues in Economics and Finance* 10: 1-7.

Hirshleifer, D., K. Hou, and S.H. Teoh. 2009. Accruals, Cash Flows, and Aggregate Stock Returns. *Journal of Financial Economics* 91: 389-406.

Holthausen, R.W., and R.L. Watts. 2001. The Relevance of the Value-Relevance Literature for Financial Accounting Standard Setting. *Journal of Accounting & Economics* 31: 3-75.

Jorgensen, B., J. Li, and G. Sadka. 2009. Are Accounting Standards Diversifiable? Evidence of the Aggregate Valuation Effects of Standards. Working Paper, University of Colorado at Boulder.

Khan, M., and R.L. Watts. 2009. Estimation and Empirical Properties of a Firm-Year Measure of Accounting Conservatism. *Journal of Accounting & Economics* 48: 132-150.

Kothari, S.P. 2001. Capital Markets Research in Accounting. *Journal of Accounting & Economics* 31: 105-231.

Kothari, S.P., J. Lewellen, and J.B. Warner. 2006. Stock Returns, Aggregate Earnings Surprises, and Behavioral Finance. *Journal of Accounting and Economics* 79: 537-568.

Kozicki, S. 1999. How Useful are Taylor Rules for Monetary Policy? *Federal Reserve Bank of Kansas City Economic Review* 2nd Quarter 1999: 5-33.

LaFond, R., and R.L. Watts. 2008. The Informational Role of Conservatism. *The Accounting Review* 83: 447–478.

Landefeld, J.S., E.P. Seskin, and B.M. Fraumeni. 2008. Taking the Pulse of the Economy: Measuring GDP. *Journal of Economic Perspectives* 22: 193-216.

Leuz, C., and P.D. Wysocki. 2008. Economic Consequences of Financial Reporting and Disclosure Regulation: A Review and Suggestions for Future Research. Working Paper, University of Chicago.

Li, F., and N. Shroff. 2010. Financial Reporting Quality and Economic Growth. Working Paper, University of Michigan.

Lobo, G.J., and J. Zhou. 2006. Did Conservatism in Financial Reporting Increase after the Sarbanes Oxley Act? Initial Evidence. *Accounting Horizons* 20: 57-73.

Lundholm, R.J. 2003. Historical Accounting and the Endogenous Credibility of Current Disclosures. *Journal of Accounting, Auditing, and Finance* 18: 207–229.

Newey, W.K., and K.D. West. 1987. A Simple, Positive Semi-Definite, Heteroskedasticity and Autocorrelation Consistent Covariance Matrix. *Econometrica* 55: 703-708.

Orphanides, A. 2003. Historical Monetary Policy Analysis and the Taylor Rule. *Journal of Monetary Economics* 50: 983-1022.

Orphanides, A. 2004. Monetary Policy Rules, Macroeconomic Stability, and Inflation: A View from the Trenches. *Journal of Money, Credit and Banking* 36: 151-175.

Patatoukas, P.N., and J. Thomas. 2010. More Evidence of Bias in Basu (1997) Estimates of Conditional Conservatism. Working Paper, Yale University.

Penman, S.H., and X. Zhang. 2002. Accounting Conservatism, the Quality of Earnings, and Stock Returns. *The Accounting Review* 77: 237-264.

Romer, C.D., and D.H. Romer. 2000. Federal Reserve Information and the Behavior of Interest Rates. *American Economic Review* 90: 429-457.

Roychowdhury, S., and R.L. Watts. 2007. Asymmetric Timeliness of Earnings, Market-to-Book, and Conservatism in Financial Reporting. *Journal of Accounting & Economics* 44: 2-31.

Ryan, S.G. 2006. Identifying Conditional Conservatism. *European Accounting Review* 15: 511-525.

Sadka, G., and R. Sadka. 2009. Predictability and the Earnings-Returns Relation. *Journal of Financial Economics* 94: 87-106.

Seetharaman, A., B. Srinidhi, and Z. Swanson. 2005. The Effect of the Private Securities Litigation Reform Act of 1995 on Accounting Conservatism. *Journal of Accounting and Finance Research* 13: 11-26.

Shivakumar, L. 2007. Aggregate Earnings, Stock Market Returns and Macroeconomic Activity: A Discussion of "Does Earnings Guidance Affect Market Returns? The Nature and Information Content of Aggregate Earnings Guidance". *Journal of Accounting and Economics* 44: 64-73.

Sims, C.A. 2002. The Role of Models and Probabilities in the Monetary Policy Process. *Brookings Papers on Economic Activity* 2: 1–40.

Sloan, R. 1996. Do Stock Prices Fully Reflect Information in Accruals and Cash Flows About Future Earnings? *The Accounting Review* 71: 289-315.

Stocken, P.C. 2000. Credibility of Voluntary Disclosure. *RAND Journal of Economics* 31: 359–374.

Taylor, J.B. 1993. Discretion Versus Policy Rules in Practice. *Carnegie-Rochester Conference Series on Public Policy* 39: 195-214.

Taylor, J.B. 1999. *Monetary Policy Rules*. Chicago, IL. University of Chicago Press.

Taylor, J.B. 2007. The Explanatory Power of Monetary Policy Rules. *Business Economics* October 2007: 8-15.

Vuolteenaho, T. 2002. What Drives Firm-Level Stock Returns? *Journal of Finance* 57: 233-264.

Watts, R. 2003a. Conservatism in Accounting, Part I: Explanations and Implications. *Accounting Horizons* 17: 207-221.

Watts, R. 2003b. Conservatism in Accounting, Part II: Evidence and Research Opportunities. *Accounting Horizons* 17: 287-301.

Watts, R., and J. Zimmerman. 1986. *Positive Accounting Theory*. Englewood Cliffs, NJ. Prentice Hall.

Waymire, G. 2009. Exchange Guidance is the Fundamental Demand for Accounting. *The Accounting Review* 84: 53-62.

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